ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF FINANCIAL AND OPERATIONAL SUSTAINABILITY OF MFIs IN ETHIOPIA

By

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Determinants of Financial and Operational Sustainability of Microfinance Institutions in Ethiopia

A Thesis submitted to Addis Ababa University in partial fulfillment of the requirements for the Degree of Masters of Science in Accounting and Finance

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November, 2015

STATEMENT OF DECLARATION

I, Sileshi Mirani, declare that this study entitled "Determinants of Financial and Operational Sustainability of Microfinance Institutions in Ethiopian" is my own work. I have carried out independently the research work with the guidance and support of the research advisor. This study has not been submitted to any degree/diploma in this or any other institution. It is done in partial requirement of the MSc Degree in Accounting and Finance.

Sileshi Mirani: _____

Date: November, 2015

STATEMENT OF CERTIFICATION

This is to certify that Sileshi Mirani has carried out his research work on the topic entitled "Determinants of Financial and Operational Sustainability of Microfinance Institutions in Ethiopian". This work, to the best of my knowledge, is original in nature and is suitable and accepted for submission for the award of MSc in Accounting and Finance.

Advisor: Abebe Yitayew (PhD) _____

Date: November, 2015

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This is to certify that the thesis prepared by Sileshi Mirani, entitled: **Determinants of Financial and Operational sustainability of MFIs in Ethiopia** and submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abstract

Researches reveal that an enduring problem facing MFI is how to attain financial and operational sustainability. Several studies have been conducted to determine the factors affecting the financial and operational sustainability of MFIs. However, there are insufficient studies conducted on this area in Ethiopia. Therefore, this study was conducted to fill the gap. This study is based on quantitative research approach using panel data fixed regression as the main data analysis technique. The study was based on a 10 years secondary data obtained from the annual bulletin of AEMFI and mix-market database for 13 selected MFIs in Ethiopia. The study found that grant to asset ratio, cost per borrower, GDP growth rate, deposit to loan ratio and gross loan portfolio, affects the financial self-sufficiency and sustainability of Ethiopian MFIs significantly. Similarly, return on asset, experience of MFIs, cost per borrower, portfolio at risk and operating expense ratio affect their operational sustainability. The Study also found that MFIs in Ethiopia are operationally self-sufficient while they are not financially self-sufficient. This study recommends microfinance institutions to reduce grant to finance their loan, to increase their loan portfolio, find ways of serving the borrowers at the lowest possible cost, increase profitability to raise the return on asset, by making assets operational and minimizing operating expenses.

Key words: MFIs, sustainability, FSS, OSS, self-sufficiency

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List of Acronyms

ACCION	American for Community Cooperation in other Nations
ACSI	Amhara Credit and Saving Institution
AdCSI	Addis Credit and Saving Institution
AEMFI	Association of Ethiopian Microfinance Institutions
CGAP	Consultative Group to Assist the Poor
CPB	Cost per Borrower
DEA	Data Envelopment Analysis
DECSI	Dedebit Credit and Saving Institution
DER	Debt to Equity Ratio
DLR	Deposit to loan ratio
DW	Derbin Watson
FINCA	Foundation for International Community Assistance
FSS	Financial Self Sufficiency
GDP	Growth Domestic Product
GLP	Gross Loan Portfolio
MFI	Microfinance institutions
MIX	Microfinance Information Exchange
MDG	Millennium Development and Growth
MoFED	Ministry Of Finance and Economic Development
NAB	Number of active borrowers
NBE	The National Bank Of Ethiopia
NGO	Non-Governmental Organizations
PRSP	Poverty reduction strategy paper
OCSSCO	Oromia Credit and Saving Share Company
OER	Operating Expense ratio
OSS	Operational self-sufficiency
PAR	Portfolio at Risk
PEACE	Poverty Eradication and Community Empowerment
ROA	Return on Asset
ROE	Return on Equity
SFPI	Specialized Financial and Promotional Institution

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Chapter One

1. Introduction

In this section the general background of the study, definitions and purpose are discussed.

1.1 Background of the study

Microfinance has emerged as a noble substitute for informal credit and an effective and powerful instrument for poverty reduction among people who are economically active but financially constrained and vulnerable in various countries (Morduch & Haley, 2002). It covers a broad range of financial services including loans, deposits and payment services, and insurance to the poor and low-income households and their micro-enterprises. Convincing research evidence exists showing significant role of MFIs in improving the lives of the deprived communities in various countries.

According to Lengerwood (1999) microfinance has evolved as an economic development approach, intended to benefit low-income individuals or groups. The term may also refer to the provision of financial services to low-income clients, including the self-employed. Financial services generally include savings and credit; however, some micro-finance organizations also do provide insurance and payment services. In a nutshell, the term microfinance could be defined as not simply banking; rather it involves making financial resources available to the productive poor. It must be pointed out that for microfinance to perform a creditable function as a poverty reduction and development tool, governance is of critical importance.

One of the main objectives of financial institutions is mobilizing resources (in particular domestic saving) and channeling them to the would-be investors. This intermediation role of financial institutions takes different forms in different economic systems. Microfinance has become an important tool for poverty reduction in many parts of the world. Microfinance institutions (MFIs) target the poor through innovative approaches which include group lending, progressive lending, regular repayment schedules, and collateral substitutes (Kimando, et.al., 2012).While many factors contribute to poverty, its most obvious manifestation is insufficient household income. Both the extent of income-generating opportunities and ability to respond to such opportunities are determined to a

great degree by access to affordable financial services. Increasing the access of poor households to microfinance is therefore being actively pursued worldwide.

Wolday (2000) stated that, the development of microfinance institutions in Ethiopia is a recent phenomenon. The proclamation, which provides for the establishment of microfinance institutions, was issued in July 1996. Since then, various microfinance institutions have legally been registered and started delivering microfinance services. In particular, the Licensing and Supervision of Microfinance Institution Proclamation of the government encouraged the spread of Microfinance Institutions (MFIs) in both rural and urban areas as it authorized them among other things, to legally accept deposits from the general public (hence diversify sources of funds), to draw and accept drafts, and to manage funds for the micro financing business (Getaneh G, 2005).

According to Wolday et al., (2014), development of MFIs in Ethiopia has a legal back up with government proclamation no.40/1996 paved the way for the establishment of MFIs.Currently about 36 Microfinance Institutions are legally registered and licensed by National Bank of Ethiopia (NBE) and operating in the country at varying capacity. Generally, based on their portfolio size, the Ethiopian MFIs are classified in three peer categories: small, medium and large (Wolday et al., 2014).

Although the Government of Ethiopia has allowed private ownership of financial institutions, the financial sector is still dominated by large public financial institutions (Ebisa et al 2013). In recent years, the state and regional governments have made a major push to increase financial services for agriculture, micro and small enterprises and low-income households (IFAD, 2009).

The Ethiopian microfinance sector is characterized by its rapid growth, an aggressive drive to achieve scale, a broad geographic coverage, a dominance of government backed MFIs, an emphasis on rural households, the promotion of both credit and savings products, a strong focus on sustainability and by the fact that the sector is Ethiopian owned and driven (Ebisa et al 2013). The industry has a strong focus on loans to the very poor, as indicated by the relatively small loans when compared to neighboring countries. Sector outreach is impressive and the financial performance of the sector is considered good, although the operational margins and profitability are low. MFIs have also mobilized a significant

amount of savings, thereby improving financial as well as operational sustainability (MFT, 2011).

Microfinance is the supply of loans, savings, money transfers, insurance, and other financial services to these low-income and poor self-serving people. Microfinance institutions which encompass a wide range of financial service providers that vary in legal structure, mission, and methodology offer these financial services to clients who do not have access to mainstream banks or other formal financial service providers.Melkamu (2012), explained in his desertation that, Microfinance institutions play a significant role in alleviating poverty in a country where the society has no or limited access to financial service provisions. Because of these and other important missions, they have attracted the attentions of different institutions especially donors which have missions to end poverty in the world. Donors and institutions want to evaluate the performance of an MFI weather they reach the poor society and are working towards achieving the mission for which they are established for. The MFIs need to be both operationally and financially sustainable in order to continue serving the society. Among the available measures, financial self-sufficiency and operational self-sufficiency are the predominant profitability and sustainability measurement variables. This has been needed because mostly microfinance institutions rely on the funds which are obtained from donors (Melkamu, 2012).

Sustainability refers to the ability to continue any given activity into the future within the likely existing resources of an organization, as part of its ongoing budgetary and management processes (Kimando, et al., 2012). Accordingly MFIs must struggle to have good financial and operational performance so that they can play a major role in the poverty reduction while achieving their primary objectives. Therefore, this study focuses on the determinants of financial and operational sustainability of microfinance institutions in Ethiopia.

1.2 Statement of the problem

According to Mazlan et al. (2014) microfinance services have become a proven tool against poverty in mostly developing countries of the world including Bangladesh, India, Indonesia and South African sub-continents.

It has also noted that microfinance programs do substantially better than control households in Bangladesh (Morduch, Jonathan, 1999). Microfinance institutions (MFIs)target the poor through innovative approaches which include group lending, progressive lending, regular repayment schedules, and collateral substitutes (Mazlan et al., 2014). While achieving on this poverty reduction goal, MFIs should also be financially sustainable. Scholars identified that an efficient MFI management should promote these two objectives weather financial self-sufficiency when they are able to cover all administrative costs, loan losses, and financing costs from operating income and operational self-sufficiency within the organization (Melkamu, 2012).

A large number of empirical studies have led the policy makers and analysts to believe that the microfinance programs in various countries are playing significant role in changing the lives of the very poor people by smoothing their consumption. Tilahun in his article, Tilahun(2013) stated that the forefront objective of the development strategy of Africa is poverty reduction and elimination. Limited access to credit by the poor has been identified as one of the factors contributing to poverty. Microfinance institutions help in reducing poverty by providing the poor with sustainable credit facility to start a small business. Empirical evidence establishes that less than 15 percent of the population in developing countries has access to the mainstream financial services (Aryeetey, 1995); (Tilahun, 2013). The microfinance sector, apart from being a critical component of the financial system, is also regarded as a poverty reduction strategy for developing countries (Kyereboah-coleman, 2007).

Development practitioners, policy makers, and multilateral and bilateral lenders, recognize that providing efficient microfinance services is important for a variety of reasons. Improved access to microfinance services can enable the poor to smoothen out their consumption, manage their risks better, build their assets, develop their microenterprises, enhance their income-earning capacity, and enjoy an improved quality of life.

Many scholars including (Woller and Schreiner, 2002; Christen et al., 1995) stated that one of the major problem MFIs facing is how to attain sustainability both financially and operationally. Today many key players in the industry use sustainability as one core criteria to evaluate the financial and operational performance of MFIs besides the outreach and impact measures. Accordingly the issue of sustainability of MFIs has attracted the attention

of many researchers and academicians to put their eyes towards finding the determinants of sustainability of MFIs in general (Yaron, 1992). In addition to the financial factors the sustainability of MFIs is highly affected by national and international financial regulations, political stability, geographical coverage, reach of the microfinance institutions and other non-financial factors (Kimando, et al. 2012).

Even though, the level and significance of the determinant factors affecting the operational efficiency and financial sustainability of MFIs vary with countries, many studies have been conducted to determine factors affecting financial sustainability and cost efficiency of MFIs using the scale and category of MFIs in different countries (Cull et al., 2007) and (Christen et al., 1995). These and other scholars argument on the driving factors of sustainability of MFIs is in relation to the MFIs financing structure (such as: size, capital to asset ratio, debt to equity ratio, deposit to loan ratio, gross loan portfolio to total asset and others), institutional characteristics or scale of MFIs (such as Experience/age of MFI, number of personnel and many others), their outreach capacity indicators (like: Number of active borrowers, gross loan portfolio, and the like) and macroeconomic variables (such as rate of inflation and real GDP growth rate).

As mentioned by the report of IFAD, (2001) and as sited by Degefe, (2009), the demand for financial services (including MFIs) in Ethiopia is badly high and the demand largely dependent on the success and sustainability of these institutions. Due to this and other reasons the researcher, believes more research needs to be made on the area of sustainability and the determinants of it in Ethiopian MFIs in a more detail and comprehensive way.

To this regard various researchers have tried to study the determining factors for the sustainability of Ethiopian MFIs. For instance, Melkamu (2012) has conducted his research on the determining factors of both financial and operationa sustainability of MFIs in Ethiopia, but fails to consider the effects of macro economic factors and some important explanatry variables. Yenesew (2014), Yirsaw (2008), and Asnakew (2012) have tried to sort out the driving factors of performance and sustainability of MFIs in Ethiopia. Furthermore, study on the industry's outreach and financial performance using descriptive analysis, graphs and percentage growth rates has been conducted by other scholar (Kereta, 2007). The detailed work made by Degefe Duressa, on the title 'microfinance in Ethiopia'

that assess the development of microfinance institutions in Ethiopia is worth to mention(Degefe Duressa Obo, 2009).However, to the best knowledge of the researcher these studies failed to explore a compressive analysis of financing structure, firm characteristics and macroeconomic variables as determining factors for the sustainability of MFIs in Ethiopia using two proxies namely, financial self-sufficiency and operational self-sufficiency. In addition, Ethiopia as one of the developing countries has developed a Poverty Reduction strategy paper (PRSP), to achieve the Millennium Development Goals (MDG), in the document one of the area that got greater emphasis is that of MFIs(MoFED, 2002).

As mentioned by Ebisa Deribie, et al., (2013), most of the MFIs in Ethiopia have mother NGOs, Government segment or subsidizers, as a source of fund. However, operating with a subsidized fund will not ensure the MFIs definite continuity with sustainability (Degefe Duressa Obo, 2009).

Therefore, to fill the gap in the preveous researches, this study has donea comprehensive analysis on the determinants of financial and operational sustainability of MFIs in Ethiopia, by considering a number of more explanatoryvariables,namely: Debt to equity ratio (DER), GDP growth rate, inflation rate, grant to asset ratio (GAR) of MFIs, deposit to loan ratio (DLR) of MFI, operating expense ratio (OER), gross loan portfolio(GLP), and cost per borrower(CPB) to measure the financial self-sufficiency and Return on asset (ROA), Experience of MFI, number of active borrowers (NAB), cost per borrower (CPB), Portfolio at risk (PAR) of MFI, operating expense ratio (OER) and debt to equity ratio (DER) of an MFI to measure the dependent variable operational self-seficiency. Accordingly, the researcher has hypothesised the relationship between the dependent and independent variables for both proxiesand precented below.

1.3 Hypothesis for the Determinants of financial and operational sustainability of MFIs in Ethiopia

1.3.1 Financial Self-Sufficiency

H1: There is a negative significant relationship between debt to equity ratio of microfinance institutions and Financial Self-Sufficiency of Ethiopian MFIs;

H2: There is a positive significant relationship between GDP growth rates and financial self-sufficiency of Ethiopian MFIs;

H3: There is a negative significant relationship between inflation rate and financial self-sufficiency of MFIs in Ethiopia;

H4: Grant to asset ratio of a microfinance institution is significantly and negatively related to financial self-sufficiency of MFIs in Ethiopia;

H5: There is a positive significant relationship between deposit to loan ratio of microfinance institutions and financial self-sufficiency of MFIs in Ethiopia;

H6: Operational expense ratio has significant negative effect on financial self-sufficiency of MFIs in Ethiopia;

H7: Gross loan portfolio has a significant positive relationship with financial self-sufficiency of MFIs in Ethiopia;

H8: Cost per borrower is significantly and negatively related to financial self-sufficiency of MFIs in Ethiopia;

1.3.2 Operational self-sufficiency

H1: Adjusted return on asset (ROA) has significant positive relationship with the operational self-sufficiency of MFIs in Ethiopia;

H2: There is a significant positive relationship between experience (age) of MFI and the operational self-sufficiency of MFIs;

H3: Cost per borrower has a negative significant effect on the operational self-sufficiency of MFIs in Ethiopia;

H4: There is positive significant relationship between the number of active borrowers and operational self-sufficiency of MFIs in Ethiopia;

H5: There is a significant negative relationship between portfolio at risk and operational self-sufficiency of Ethiopian MFIs;

H6: Operational expense ratio has negative significant effect on the operational self-sufficiency of MFIs in Ethiopia;

H7: Debt to equity ratio of MFIs in Ethiopia has a positive significant effect on the operational self-sufficiency;

1.4 Objectives of the study

To answer the above research questions or hypothesis, the researcher has stated the following general and specific objectives.

1.4.1 Main objective of the study

- The main objective of this study is to empirically test the financial and operational determinants for the sustainability of microfinance institutions in Ethiopia.

1.4.2 Specific objectives

- To examine the financial self-sufficiency of MFIs in Ethiopia using descriptive statistics
- To examine the operational self-sufficiency of MFIs in Ethiopia using descriptive statistics
- To empirically test whether DLR, GLP & GDP growth rate have significant positive relationship with FSS of MFIs
- To empirically test whether GAR, DER, CPB, OER, & Inflation have significant negative relationship with FSS of MFIs
- To empirically test whether DER, CPB, OER, & PAR have significant negative relationship with OSS of MFIs
- To empirically test whether ROA, NAB, & Age of MFIs have significant positive relationship with OSS of Ethiopian MFIs

1.5 Research Methodology

To achieve the above stated objectives and to answer the research questions, the study considered a10 year audited financial quantitative secondary data from 13 microfinance institutions from year 2003 to 2012 GC, as compiled and issued by AEMFI from year 2005 to 2014 GC and Mixmarket website. Accordingly a total of 130 observations have been taken based on availability of data and the need for the quality of resulting estimates. Furthermore, information related to the GDP growth rate and inflation rate has been gathered from the World Bank website, National Bank of Ethiopia (NBE) and Ministry of Finance and Economic Development (MoFED) websites. Generally information related to

Ethiopian MFIs' financing structure and firm characteristics and outreach indicators were collected from AEMFI and MixMarket website. Secondary data related to the macroeconomic variables have been collected from NBE, MoFED and the World Bank websites. Furthermore, for comparing Ethiopian MFIs with other jurisdiction, the researcher used different sources of theoretical literatures and empirical studies.

To measure the determinant variables for financial sustainability (FSS) of MFIs in Ethiopia, the researcher considered debt to equity ratio (DER), deposit to loan ratio (DLR), GDP growth rate, inflation rate, grant to asset ratio (GAR)of MFIs, number of active borrowers (NAB), gross loan portfolio (GLP) and cost per borrower (CPB)as explanatory variables. On the other hand, return on asset (ROA), experience (age), cost per borrower (CPB), number of active borrowers (NAB), portfolio at risk (PAR), operating expense ratio (OER), and debt to equity ratio (DER) of MFIs has been taken as explanatory variables to explain the operational self-sufficiency variable (dependent variable).The collected panel data has been regressed and interpreted by using fixed effect regression model and descriptive statistics. The study employed fixed effect regression technique to enhance the strength of the model and to minimize the cross section effects of the intercepts. The analytical models and variables considered in this study are based on theoretical reviews and on suggestions from empirical evidences of the most popular studies discussed in this paper.

1.6 Structure of the study

This paper has five chapters. The first chapter sets out the introduction to provide overview and background of the study onboard. The second chapter draws related studies and literatures on the topic under consideration. The methodology of the research has been presented in chapter three. In chapter four data presentation, findings and discussions are presented in detail. Concluding remarks and recommendations are outlined in chapter five. At the end of the paper, references and appendices are attached.

1.7 Significance of the study

Microfinance institutions play a significant role in meeting the financial needs of poor peoples, farmers, household and micro entrepreneurial. Usually the financial resource

flows out from the micro finance institutions help to improve living standard, educational level, health and financial position of the poor segment of the society and reduce poverty. Hence micro finance helps in contributing a lot towards the overall development of the economy. To achieve this stated mission continually MFIs themselves have to be sustainable both operationally and financially. Therefore, this study help the decision makers of MFIs to watch out the determining factors for their sustainability in general and in specific and give due focus for the factors. Majority of Ethiopian population is poor and hence depend on MFIs as source of capital and general finance. Since the study seeks to establish factors of sustainability of MFIs, it would provide invaluable information to them indirectly, so that it would eventually help the MFIs to manage the factors that significantly influence their sustainability.

Furthermore, this research has immense significance for future researchers & academicians as a base to modify the models and variables considered and do their scholarly. Finally, the researcher himself is benefited by using the paper as partial fulfillment for a degree of MSc in Accounting and Finance and if need arises for further senior and more comprehensive work in the areas of MFIs sustainability the researcher can use this work as a footprint.

1.8 Limitations of the study

This study has primarily considered and uses secondary quantitative data to test the financial determinants of sustainability of MFIs in Ethiopia. However, the researcher believes that this study would be stronger, if it was supported by additional qualitative factors that affect the sustainability of the microfinance institutions. According to various sources, the microfinance institution and microfinance service does not have a long history in Ethiopia, and hence the researcher limits the scope only to the available secondary data for 10 years. Furthermore, the study is limited to only up to year 2012.

Chapter Two

2. Literature review

This particular chapter comprises eleven sections describing the subject matter in different approaches. Accordingly, the first three parts will explain the general concept, definition, and historical development of MFIs in general and in Ethiopia. in the rest f the six chapters the performance, sustainability, theories, perspectives, efficiency, determinant factors for sustainability, empirical evidences and reviews have been discussed and finally the empirical studies in Ethiopia and the gap in the research has been presented.

2.1 General Concept and definition of microfinance

The field of microfinance institutions (MFIs) is still a fairly recent topic in economic research. The most important finding in the last two decades in the world of finance did not come from the world of the rich or the relatively well-off. More important than the hedge fund or the liquid-yield option note was the finding that the poor can save, can borrow (can indeed decide on loans to fellow poor), and will certainly repay loans. This is the world of microfinance (R Srinivasan and M S Sriram, 2013). Lack of access to credit is generally seen as one of the main reasons why many people in developing economies remain poor. Usually, the poor have no access to loans from the banking system, because they cannot put up acceptable collateral and/or because the costs for banks of screening and monitoring the activities of the poor, and of enforcing their contracts, are too high to make lending to this group profitably. Since the late 1970s, however, the poor in developing economies have increasingly gained access to small loans with the help of so-called microfinance programs (Niels Hermes & Robert Lensink, 2007).

The definition of microfinance varied with time, region and among scholars. For example, definition of microfinance as provided by Robinson, (1998) is, 'Microfinance refers to small-scale financial services for both credits and deposits that are provided to people who farm or fish or herd; operate small or microenterprises where goods are produced, recycled, repaired, or traded; provide services; work for wages or commissions; gain income from renting out small amounts of land, vehicles, draft animals, or machinery and tools; and to other individuals and local groups in developing countries, in both rural and urban areas'. However, many of writers in the field defined microfinance as the provision of financial

services to low-income people. It refers to a movement that envisions a world where low-income households have permanent access to high-quality and affordable financial services to finance income-producing activities, build assets, stabilize consumption and protect against risks.

The microfinance sector differs mainly from other financial sectors in that microfinance addresses clients who are less financially rewarding or are not in conventional banks' interest. MFIs serve poor populations which cannot post any collateral or other financial securities with microfinance services, such as small-sized loans, often $100 or even less, so called micro credits (Reno-Weber, 2008). As mentioned by Robinson M., (2001) and as cited by Yoshi Fukasawa, et al.,(2011), the success of MFIs is based on their two main goals: the group-lending concept and teaching self-help to the poor.

The term microfinance is of recent origin and is commonly used in addressing issues related to poverty alleviation, financial support to micro-entrepreneurs, gender development etc. There is, however, no statutory definition of micro finance. The taskforce on supportive policy and Regulatory Framework for Microfinance has defined microfinance as "Provision of thrift, credit and other financial services and products of very small amounts to the poor in rural, semi-urban or urban areas for enabling them to raise their income levels and improve living standards". The term "Micro" literally means "small". But the task force has not defined any amount. At the meantime, the narrower definitions try to equate microfinance with microcredit, following early practice of NGO credit schemes. Microcredit is the provision of small loans to poor households and small business operators with or without guarantee (Degefe Duressa Obo, 2009).

Many scholars however, argued that the term microcredit was initially closely associated with microfinance which is very small loans to unsalaried borrowers with little or no collateral. Indeed this view is shared by Montgomery H., et al., (2011) when they contended that there is a misconception in the minds of many that microfinance and micro-credit are synonymous. They comprehended that while microfinance refers to an array of financial services that include credit, savings, and insurance, whereas, micro-credit is the provision of credit by non-bank financial intermediaries or commercial banks which is usually used as capital for small business.

2.2 History and Development of MFIs

Although microfinance has existed for centuries in various forms, the development of distinct MFIs came into prominence in the 1980s after the emergence of the Grameen Bank, which developed strategies and lending techniques that influenced microfinance organizations all over the world (Vicki Bogan, et al., 2007).

Hence the idea to establish microfinance institutions traces back to Muhammad Yunus, who developed it as a way to eradicate poverty in his home country Bangladesh. Accordingly, the first Microfinance operation started approximately 30 years ago in South Asia. In 1983, he founded Grameen Bank, the first institution which realized this concept and started to operate in the microfinance business in the proper sense (The Norwegian Nobel Committee, 2006). According to Kannan, et al., (2013), however, the history of microfinance has been traced back as far as the middle of the 1800s, when the theorist Lysander Spooner was writing about the benefits of small credits to entrepreneurs and farmers as a way of getting people out of poverty, when he founded the cooperative lending banks to support farmers in rural areas.

Major adaptations of what we call today "microfinance" began to appear in the early 1900s in parts of rural Latin America (Global Envision, 2006). While the goal of such rural finance interventions was usually defined in terms of modernizing the agricultural sector, they usually had two specific objectives: increased commercialization of the rural sector, by mobilizing "idle" savings and increasing investment through credit, and reducing oppressive feudal relations that were enforced through indebtedness. Accordingly during this period many of these institutions transformed themselves into formal financial institutions in order to access and lend client savings, to enhance their outreach (http://www.cgap.org).

Armendáriz de Aghion, et al.,(2004) indicated that, the modern expression of the term "micro financing" has roots in the 1970s when organizations, such as Grameen Bank of Bangladesh with the microfinance pioneer Muhammad Yunus, were starting and shaping the modern industry of micro financing. Through Grameen Bank, the modern microfinance pioneer, Yunus, was able to offer access to very small amounts of capital with no collateral requirements and at a very low interest rate, which was almost unheard of when the loan is provided to the poor. In the meantime, experimental programs in Bangladesh, Brazil and a

few other countries extended tiny loans to groups of poor women to invest in micro-businesses. This type of microenterprise credit was based on solidarity group lending in which every member of a group guaranteed the repayment of all members (Global Envision, 2006). These "microenterprise lending" programs had an almost exclusive focus on credit for income generating activities, in some cases accompanied by forced savings schemes, targeting very poor (often women) borrowers. Since the mid-1990s, as Global Envision, (2006) underscored, the term "microcredit" began to be replaced by a new term "microfinance" that emerged to include not only credit, but also savings, insurance, payments, remittances and other financial services. There are number of institutions, such as donor agencies, international NGOs and research institutions, which have played an important role in developing microfinance programs and institutions by supporting microfinance initiatives financially.

As noted by no. 40 of CGAP, and sited by Hashemi, et al., (2005), mmicrofinance institutions in sub Saharan Africa (SSA) and the developing world have over the years attracted and received billions of US dollars (valued at over US$4 billion annually worldwide) in subsidies and concessionary funds. CGAP, (2010) research reveals that the stock of foreign capital investment in the microfinance sector has more than tripled in the years since 2004, much of it drawn by the sectors' seemingly strong growth and reputation for doing good. MFIs in low income countries seem to rely a lot on subsidies and other forms of discounted financial support (Hudon, M and Traca, D., 2008).

As noted by CGAP, one of the key principles of microfinance is building financial systems for the poor means building sound domestic financial intermediaries that can provide financial services to poor people on a permanent basis. Such institutions should be able to mobilize and recycle domestic savings, extend credit, and provide a range of services. Dependence on funding from donors and governments-including government-financed development banks-will gradually diminishes as local financial institutions and private capital markets mature. Today, globally, microcredit and microfinance have got extensive recognition and regarded as an effective tool for poverty alleviation and for economic empowerment. They comprise a wide range of institutions, from credit unions and cooperatives to NGOs, government agencies, private companies and commercial banks. Sources, Responsibility, (2014), indicate that currently there are more than 10,000 MFIs

globally and around 1.2 billion adults with no banking account indicating significant potential. Despite this magnificent growth only around 500 of these MFIs are self-sustaining in economic terms and this has led to a greater focus on (both operational and financial) sustainability of MFIs.

2.3 Microfinance Institutions and their development in Ethiopia

Micro financing in Ethiopia formally started in the years 1994-95 (Ramanaiah M.Venkata and Mangala C.Gowri, 2011). In Particular, the licensing and supervision of Institution proclamation of the government encouraged the spread of microfinance institutions (MFIs) in both rural and Urban areas as it authorized them among other things, to legally accept deposits from the general public for diversifying sources of funds, to draw and accept drafts, and to manage funds for the Micro financing business.

A key component of Ethiopia's development strategy is the establishment of sustainable microfinance institutions serving large numbers of poor people. While non-governmental organization (NGO) credit schemes and informal sources of finance have existed in Ethiopia for many years, the government instituted a legal and policy framework for MFIs in 1996 through Proclamation 40/1996 (Gebrehiwot Ageba, 2002) as sited by (SIDA, 2007). Since then, 35 MFIs have registered and licensed with the National Bank of Ethiopia and operate under the backing of this Proclamation(NBE, 2015).Although the development of microfinance institutions in Ethiopia started very recently, the industry has shown a remarkable growth in terms of outreach particularly in number of clients, 2.8 million borrowers, depositors 3.4 million (MIXMARKET, 2015). According to MoFED, (2002), Ethiopia is one of the 70 countries that developed a poverty reduction strategy paper (PRSP). This PRSP is becoming the operational framework to translate the global MDG targets into national actions. This document is serving as a practical building block to address the country's challenges. As per the UN declarations, by the year 2015, the poverty situation of the country should decrease by half from its level in 1999. In the PRSP document, institutions and the political economy of society are considered key in influencing economic growth and its impact on poverty. It also indicates that reform of the legal system, enforcing contracts, ensuring property rights, reducing conflicts (internal/external), and improving the efficiency of the bureaucracy can generate a growth

pattern that ensures faster reduction of poverty and the achievement of the Millennium Development Goals in the country (MoFED, 2002). In the document, microfinance is indicated among the specific means that is given greater emphasis and is expected to play essential role for reducing poverty in rural areas of the country where the bulk of its populace dwell.

Thus, most of the microfinance services providing institutes have articulated creating a small and easily accessible loan to the poor as their primary objective with the expectation of fostering pro-poor-growth. Hence, dealing with the sustainability of MFIs in Ethiopia is of a paramount importance to bring the MDG objectives feasible in relation to the emphasis given to the MFIs sector.

2.4 Performance of MFIs

Performance of an institution or a company shall be measured not only from the objectives of the organizations angel, but also from the industry average. As indicated by parts of this paper, the goal of MFIs is to reduce or eradicate poverty by giving access to the poor financial resource and by creating awareness for resource utilization. In the early days when MFI started, they were financed by donor funds that have a poverty eradication goal. As explained by Woldeyes, (2012), hence the performance of the MFI was measured on how much MFI reach to the poor (outreach) and impact (how far the lives of those who get financial services are changing as compared to those who don't get these services).

However, those days, the performance of microfinance institutions was being measured by different parameters. For instance Richard Rosenberg (CGAP) has indicated Core performance indicators of microfinance institutions written for staffs who design or monitor projects that fund microfinance institutions (MFIs). He offers basic tools to measure performance of microfinance institutions in a few core areas: Breadth of Outreach: number of clients being served, Depths of Outreach: poverty level of the clients, Collection performance: performance of an MFI in collecting its loans, Financial sustainability: profitability to maintain and expand services without continued injections of subsidized donor funds, Efficiency; performance in controlling the administrative costs. These are general measures in which the performance should be considered and these can be further elaborated in detail based on (Lengerwood J, 1999).

2.5 Sustainability of MFIs

In micro-finance, sustainability can be considered at several levels of institutional, group, and individual and can relate to organizational, managerial, and financial aspects (Rao, 2001) as cited by (Kimando, et al., 2012). However, the issue of financial sustainability of microfinance institutions has attracted more attention in mainstream analysis for its contribution to poverty reduction. Sustainability is loosely defined as the ability of a MFI to cover its operating and other costs from generated revenue and provide for profit. It is an indicator which shows how the MFI can run free of subsidies (Melkamu Woldeyes, 2012). This change in emphasis has created a different perspective on the analysis of performance of the MFIs. Today many key players in the industry use sustainability as one core criteria to evaluate the performance of MFI besides the outreach other impact measures described earlier.

According to Meyer, (2012), there are two kind of sustainability that we could observe in assessing MFIs sustainability: financial self-sufficiency and Operational self- sufficiency. Financial self-sustainability is when MFIs can also cover the costs of funds and other forms of subsidies received when they are valued at market prices. A more popular definition of financial self-sustainability suggested by Micro-Banking Bulletin, CGAP, MixMarket and others by which financial sustainability is defined as total adjusted revenue as a percent of total adjusted expenses such that the result should be greater than or equal to 100%. On the other hand operational self-sufficiency is when the operating income is sufficient enough to cover operational costs like salaries, supplies, loan losses, and other administrative costs. Thus, as mentioned by AEMFI, (2014),financial sustainability is MFIs' ability to cover all costs on adjusted bases and indicate its capability to operate without ongoing subsidies including soft and grants. The adjustment goes to inflation, loan loss provisioning and cost of capital. Meyer, (2012) believed that financial self-sufficiency is a high standard measure of sustainability and brings long term perspectives for MFI operations than operational self-sufficiency. According to him the poor needed to have access to financial service on long-term basis rather than just a one-time financial support. Microfinance is said to be an effective instrument discovered in 21st century to mitigate rural poverty in the world (Ramanaiah and Mangala, 2011).

In the early days when MFIs established their finance was from donation or grants from those donors who have set their goal as eradication or reduction of poverty. Diverse literatures noted that sustainability is one of the areas that need to be assessed to enhance the full functioning of microfinance institutions. This brought the need for MFIs to be measured on how much MFI reach to the poor and how far the lives of those who get financial services are changing as compared to those who don't get these services. But as the MF industry grows in size, the need for increased financing coupled with unpredictability of donor funds trigger the issue of building a sustainable MFIs that stand on their own leg.

According to the explanation of Meyer (2002) also stated that the financial un-sustainability in the MFI arises due to un-materialization of funds promised by donors or governments. Hence MFIs shall start covering their own cost of operation from their program revenues. Thus we can loosely define sustainability as the ability of an MFI to cover its operating and other costs from generated revenue and provide for profit. It is an indicator which shows how the MFI can run independent of subsidies. Also as indicated by Basu and Woller, (2004), this change in emphasis has created a different perspective on the analysis of performance of the MFIs.

2.6 Financial Viability Indicators

Financial viability refers to the ability of the MFI to cover its costs with earned revenue. A financially viable MFI will not rely on donor funding to subsidize its operation. Common indicators here include financial spread, Operational Self Sustainability (OSS), Financial Self Sustainability (FSS) and Subsidy dependence index (Ledgerwood, 1999).

Furthermore, many scholars mentioned that the common financial viability indicators used in past studies are Financial Self-Sufficiency (FSS), Operational Self-Sufficiency (OSS), and even the profitability ratios such as Return on Asset (ROA), Return on Equity (ROE). Transition to viability is from operationally unviable (unable to cover operational costs from operational revenues) to operationally viable (able to cover operational costs from operational revenues) to financially viable (able to cover operational costs without subsidy). Failure to achieve OSS means lesser funds to loan to borrowers, hence, endangers the long-term existence of a MFI as an institution. OSS requires instituting strategies to

optimize yield and/or achieve cost efficiency. Although FSS is superior to other indicators (Cull et al., 2007;Morduch, 1999) for its comprehensiveness as it passes several adjustments to bring a more complete picture, for the purpose of this paper OSS is also used because it is a straight forward measure and it allows easy verification by donors and governments.

2.7 Efficiency in microfinance institutions

Efficiency and productivity indicators are performance measures that show how well an MFI is streamlining its operations. Efficiency indicators are used to measure the performances of MFI and mostly based on how it is using its resources mainly assets and personnel to deliver its services in an efficient manner (Wolday and Anteneh , 2013)**.**

It is not arguable that efficiency is crucial factor in competitive markets. And it will be more vital when we come to the financial institutions environment. While efficiency of conventional financial institutions has often been studied, analyses of the efficiency of microfinance institutions (MFIs) are less frequent due to the late emergence of the sector in general. Nevertheless, many MFIs are still dependent on subsidies, what has brought the debate on their efficiency under the spotlight. In traditional Banking Literature, the evaluation of financial performance by using non parametric efficiency techniques i.e. Data Envelopment Analysis (DEA), is a very common practice to empirically measure productive efficiency of decision making units (Athanassopoulos, 1997).

However the efficiency analysis of MFIs based on conventional production and intermediation model approach in non-parametric efficiency analysis framework is hard to justify because of their reliance on subsidies. The overall equation linking capital and labor inputs into profits and social change still proves difficult to master without accommodating the subsidized inputs (Cull R. et al, 2007). Therefore, measuring their efficiency demands the role of subsidies to be accounted for, an area, largely neglected in the efficiency and productivity analysis of microfinance institutions. Moreover, some donors and practitioners are concerned that excessive subsidization will hamper the promise of sustainability of MFIs but also undercut both scale and efficiency within the MFI, and possibly distort the market by favoring more inefficient institutions (Armendáriz , 2004).

2.8 Perspectives of performance measure

The different perspective on which the MF performance is to be measured has created two

opposing but having the same goals school of thought about the MF industry: the Welfarists and the Institutionists approach. The movement has come to be divided by two broad approaches, or opposing camps, regarding the best way to help the poor through access to financial services. Jonathan Morduch (1999): as sited by Woldeyes, (2012) refers to this division as the microfinance rupture. The irony is that while the worldviews of each camp are not inherently incompatible, and in fact there are numerous microfinance institutions that appear to embrace them both, there nonetheless, exists a large rift between the two camps that makes communication between them difficult. Here under the ideologies of the two schools of thought are discussed.

2.8.1 Welfarist thought

Welfarists argue that MFIs can achieve sustainability without achieving financial sustainability. They contend that donations serve as a form of equity and as such donors can be viewed as social investors. As per the idea of Basu and Woller (2004), unlike private investors who purchase equity in publicly traded firm, social investor's don't expect to earn monetary returns. Instead these donor investors realize a social intrinsic return. Basu and Woller (2004), believes that Welfarists tend to emphasize poverty alleviation, place relatively greater weight on depth of outreach relative to breadth of outreach and gauge institutional success according to social metrics. This is not to say that neither breadth of outreach nor financial metrics matter. Welfarists feel these issues are important, but they are less willing than Institutionist to sacrifice depth of outreach to achieve them.

In general, Welfarists emphasize depth of outreach. They are quite explicit in their focus on immediately improving the well-being of participants. They are less interested in banking persons than in using financial services as a means to alleviate directly the worst effects of deep poverty among participants and communities, even if some of these services require subsidies. Their objective tends to be self-employment of the poorer of the economically active poor, especially women, whose control of modest increases of income and savings is assumed to empower them to improve the conditions of life for themselves and their children. The center of attention is the "family." The most prominent examples of Welfarists institutions are the Grameen Bank in Bangladesh and its replicates elsewhere, and Foundation for International Community Assistance (FINCA)-style village banking programs in Latin America and, more recently, in Africa and Asia.

2.8.2 Institutionists Thought

On the contrary, Institutionists argue that unless we build sustainable MFI that are capable of running independent of subsidies, the promise of MFI of eradicating world poverty will not be met (Basu, J.C., and Woller, G., 2004). They argue that sustainable MFI helps to expand outreach and reach more poor people. Hence even if the two schools of thought seem contradictory, they are actually not. Their goal is eradicating poverty. Their difference lies on how to go about it (the approaches to alleviate poverty). Welfarists say very poor to be targeted and profitability shall be secondary. They prefer to charge subsidized and low interest rates by relying on donor funds. On the other way round, institutionists argues that donor funds are unreliable and MFI must by themselves generate enough revenues to reach more poor people in the future. They favor marginally poor customer. They charge higher interest rates and focus on efficiency of MFIs to generate profit and reach more poor.

The debate between the two schools of thought is endless and today many players in the MF industry use both the Welfarists and Institutionist perspective to assess the performance of MFIs. As cited by Woldeyes, (2012), and in the works of Basu and Woller, (2004), for many years the MFI industry was operating with subsidy from donors and governments but there is now a pressure on these organizations to be financial sustainable: as cited by . However, it seems that serving the poor and being financially self-sufficient seems contradictory.

Various arguments are forwarded: the poor can't pay high interest rate, if the poor consumes the money for which it has no collateral; there is big transaction cost in serving the poor. But these assumptions are falsified in the last 20 years and the poor is seen as capable of paying high interest as ROI of small projects are larger than large projects, the poor don't consume the money rather use it for financing his/her business, transaction cost barriers are mitigated by the creation of group lending, absence of physical collateral is mitigated by social capital. Hence contrary to the expectations the MFI industry has shown significant repayment rate although high repayment rates can't be translated into financial sustainability. However, there seem many unresolved problems.

Many MFI can't reach a significant portion of the world poor; they can't be free from subsidies. Mixed results are read on the impact of the micro-credit on lives of the poor.

Can MFIs serve the poor but still financially self-sufficient? Is the MFI model correct? If so what are hindering them to achieve the targets set? What optimal solution is available for the MFI in reaching the poor and being financially self-sufficient and operationally self-sufficient?

2.9 Determinants of sustainability: Theoretical reviews

In this specific topic, theories related to the subject have been presented.

2.9.1 Source of funding (Financing structure)

Financing structure is a financial tool that helps to govern how firms choose their funding structure. Most MFIs in the world started off as NGOs and had built substantial supply side competencies which makes funding structure had no relevance. However, with development and commercialization, MFIs are spanned off to become fully independent, the enigma of funding structure that will ensure sustainability becomes relevant. During any time of financial or banking crisis, when bailout aid is available, questions of capital structure become more salient. What is the best mix of grant, debt and equity funding which will ensure solvency and self-sufficiency? The question of optimal capital structure for MFIs, particularly ones with access to grant funding, is an open and substantial question (Bogan, et al., 2007).

Grants as an element of MFIs' funding sources

Bogan (2009) noted that existing research places the evolution of MFI funding sources within the context of an institutional life cycle theory of MFI development. According to this framework of analysis, most MFIs start out as NGOs with a social vision, funding operations with grants and concessional loans from donors and international financial institutions that effectively serve as the primary sources of risk capital for the microfinance sector. In recent years, there has been increasing internal and external pressure for the MFIs to decrease dependence on subsidized or grant funding. For example, ACCION International, an organization designed to support MFIs, helps MFIs obtain equity financing, debt financing, and other commercial funding instruments. By enabling MFIs to link directly with investors and commercial banks, ACCION strives to help them become independent of donor funds. Over the past decade, ACCION has been highly influential in encouraging donors to subsidize start-up costs only and pushing for MFIs to have a

commercial focus (Armend´ariz de Aghion, B., & Morduch, J., 2004). Since donor funds are limited in amount, reliance on this source of funding limits the ability of MFIs to expand to meet rising demand for services. There is also a question as to whether reliance on donor funds allows MFIs to avoid pressures to operate efficiently. Commercially-funded MFIs respond to the profit incentive, working to increase revenues and decrease expenses so that they can have revenues sufficient to cover all operating expenses.

MFIs with access to donor funds may not respond to these pressures to operate efficiently or may deliberately choose outreach over efficiency by serving poorer or rural clients with higher delivery costs (Armend´ariz de Aghion, B., & Morduch, J., 2005).As explained by, Bogan, et al(2007), despite keen interest in possible links between funding sources and operational sustainability and studies of relative profitability of individual institutions, there have been no systematic studies that provide robust evidence of how variations in funding or institutional structure affect the sustainability for a larger group of MFIs.

Leverage (Debt to Equity ratio)

Debt to equity ratio is the simplest measure firm leverage and believed as the drivers of MFIs sustainability and efficiency .Although maintaining best mix of debt and equity is still the subject of intense debate among scholars, three popular theories are emerged to define the appropriate mix of equity and debt so as to enhance firms' return and efficiency. In 1958 Modigliani and Miller published a seminal work in capital structure where they concluded to the broadly known theory of "capital structure irrelevance" where the capital structure is irrelevant to firm performance in perfect capital markets.

This view is further supported by Berk & DeMarzo (2007) when they argued that the law of one price implied that leverage would not affect the total value of the firm. Instead, it only changes the allocation of cash flows between debt and equity, without changing the total cash flows of the firm. The Modigliani and Miller theorem holds true under the assumption of a perfect capital market, which means: individuals and firms trade at the same, no taxes exist and no transaction costs exist. However this scenario are unlikely to happen in real world particularly in the MFI sector under which all these assumption cannot be hold true and less straight-forward. The basic MM principles are applicable to MFIs, but only after accounting for the fundamental differences in how MFIs and corporations operate (Cohen, 2003).

The manner in which revenues are generated and the nature of regulation for an MFI are markedly different from that of a corporate firm. Consequently, the theoretical notion of an optimal capital structure for MFIs' to become solvent and sustainable is not very well-defined. The issue of grant money adds another layer of complication to the capital structure question for MFIs. Does grant money create moral hazard or incentive issues with respect to MFI towards sustainability? Thus, within the context of the MFIs capital structure discussion, one is required to consider issues similar to the grant versus concessional loan debate in the foreign aid literature (Bogan, 2009).

On the other hand the pecking order theory of capital structure is emerged as one of the most influential theories of corporate finance. The pecking order theory is popularized by Myers and Majluf (1984) when they argued that equity is a less preferred means to raise capital because when managers issue new equity, investors believe that managers think that the firm is overvalued and managers are taking advantage of this over-valuation. As a result, investors will place a lower value to the new equity issuance.

The order of preferences reflects the relative costs of the various financing options. In reference to this theory Mayer (2001) noted that the pecking order theory explains why the bulk of external financing comes from debt. It also explains why more profitable firms borrow less: not because their target debt ratio is low but because profitable firms have more internal financing available. Less profitable firms require external financing, and consequently accumulate debt. However in reference to pecking order theory many MFIs in Africa may represent an interesting scenario since retained earnings are zero and perhaps following the pecking order MFIs may opt for debt since quite a number of them have no access to capital market. If evidence found that is consistent with the pecking order theory then our results should highlight a negative relationship between leverage and MFI sustainability (James, 2003).

The monotonic increase of debt for higher tax shield increases bankruptcy cost especially when profitability of the firm is low and fluctuating. This leads to 'trade off' theory of capital structure that postulates an optimum debt level or target level, where the marginal increase of present value of tax saving is just offset by the same amount of bankruptcy cost. The tradeoff theory says that the firm will borrow up to the point where the marginal value

of tax shields on additional debt is just offset by the increase in the present value of possible cost of financial distress.

According to Myers(2001) financial distress refers to the costs of bankruptcy or reorganization, and also to the agency costs that arise when the firm's creditworthiness is in doubt. Although difficult to determine the exact debt target level objectively in microfinance, because of MFIs industrial organization, trade off theory explains that there is a limit to debt financing and the target debt may vary from MFI to MFI depending on profitability, among a host of other factors. Consistently, profitable MFIs with lot of tangible asset that can be offered as collateral for debt may have a higher target debt ratio. Simply put high proportion of fixed interest capital to equity would imply that the MFI is highly indebted and therefore risks becoming insolvent increases. On the other hand highly leveraged MFIs may perform better by enjoying scale economies, enhancing their ability to boost profitability (James , 2003).

Deposit mobilization (Deposit to loan ratio)

Sustainability of MFIs depends on their saving mobilizing capacity. Deposit to loan ratio is an important indicator for MFIs that mobilize deposits. Deposit to loan ratio measures that portion of the MFIs' portfolio funded by deposits. The higher the ratio the greater is the MFIs' capability to fund it loan portfolio from its deposits and enhances commercialization of microfinance operation. Thus higher ratio brings down the cost of funds and helps MFIs to rely on internal funding. Deposit mobilization has now becoming more important in Ethiopia as commercial banks seem to be reluctant to fund MFIs' portfolio through their debt. Some commercial banks lent to MFIs, with strong third party guarantee (AEMFI, 2014).

2.9.2 Firm characteristics: scale of operation (gross loan portfolio)

Vingo (2012), stated that, in commercial microfinance, scale of operation refers to the scale of financial products and services provided to the poor by MFIs. The quality and the level of financial products and services are likely to be adapted to meet the demands of the poor which ensures that the right financial products and services are provided to the right people. According to Microbanking Bulletine No.19 (2009),the criteria for defining MFIs' scale of operation are based on their gross loan size. Accordingly MFIs having gross loan portfolio of greater than $8 million can be considered into large scale MFIs, medium MFIs do have

gross loan size of $2million to $ 8million and small scale MFIs do have gross loan size less than $2 million. Gross Loan portfolio can be used as a proxy to measure the scale of an MFI and it has positively related to sustainability (Vingo, 2012). According to him an increase in outstanding loans (scale of operation) tends to help MFIs achieve higher self-sufficiency. However, he noted that due to diseconomies of scale, large scale operation could lead to an increase in the unit cost and there is also a limit of scale due to bounded rationality.

2.9.3 Macroeconomic factors

Understanding the linkages between overall country's macroeconomic level and MFIs sustainability can make MFI evaluation more accurate and, further, can help to locate microfinance in the broader picture of economic development. Furthermore, understanding the macroeconomic impact on MFIs may also help a growing number of investment funds that target their financial resource toward MFIs, sometimes with the dual goal of earning returns for investors and achieving social impact.

Evidences arise for strong relationship between MFI performance and the broader economy. Christian, et al. (2009) has explained that, MFIs are more likely to cover costs when growth is stronger; and MFIs in financially deeper economies have lower default and operating costs, and charge lower interest rates. There is also evidence suggestive of substitutability or rivalry. For example, more manufacturing and higher workforce participation is associated with slower growth in MFI outreach (IBID).

The suggestion of most of the previous empirical studies is that macroeconomic variables are based primarily upon an economic tradition, emphasizing the importance of external market factors in determining firm's success. These typically include inflation, GDP growth rate, GDP per capita, GNI per capital, population, unemployment rate and interest rate differentials. For example Vingo (2012) indicated that the common approach has been to study the impact of macroeconomic factors by investigating the impact of GDP growth and inflation on performance. The inflation indicator refers to a rise in the general level of prices of goods and services in an economy over a period of time. Overall, the country context appears to be an important determinant of MFI performance (Christian Ahlin, et al., 2009).

2.10 Empirical evidences on drivers of sustainability of MFIs

Common financial viability indicators used in past studies are Financial Self-Sufficiency (FSS), Operational Self-Sufficiency (OSS), and even the profitability ratios such as Return on Asset (ROA), Return on Equity (ROE) (Ayele, 2014). A financially viable MFI will not rely on donor funding to subsidize its operation. Common indicators here include financial spread, Operational Self-sufficiency (OSS), and Financial Self-sufficiency (FSS) (Melkamu Woldeyes, 2012). Various researches noted that, unless FSS ratio of 100% is reached, the long-term provision of credit services is undermined by the impact of inflation and the continued necessity to rely on donor funds.

Operational self-sufficiency (OSS) requires MFIs to meet all administrative costs and loan losses from operating income. It is computed by dividing operating income by operating expenses. It is suggested, based on international experience, that successful MFIs should be able to achieve operational self-sufficiency within three to seven years. OSS is computed as the ratio of operating income to the sum of administrative expenses, loan losses and interest expenses. A firm is operationally sustainable if its OSS is 100% or more (Melkamu Woldeyes, 2012).

As cited by Woldeyes (2012) in the works of Research in the field of sustainability has flourished since when more attention has been given to the long term aspect of microfinance which can widespread around developing countries only if lending to the poor is proven to be sustainable. Following the theoretical reviews, the sections below provides the empirical results on the determinants of financial sustainability revealed from various studies. As stated in the previous section of this paper the proxy for measuring sustainability is the operational self-sufficiency (OSS) and financial self-sufficiency (FSS) ratios with their various explanatory variables of financing, firm characteristics, outreach indicators and macroeconomic factors of Ethiopian MFIs as suggested and applied by various studies in various jurisdictions.

2.10.1 Grants and deposit mobilization

Many studies undertaken around the world underscored the importance of financing structure or funding sources on sustainability. Studies undertaken by Sekabira (2013) hypothesized that grants and debts erode sustainability whereas share capital and assets

improve it and found the same result as predicted. He argued that government policy must limit MFIs access to grants and debts.

The study recommended that terrible financial need by small holders must only be solved through direct aid to the needy such as food stamps, universal education, health care and others. The same author concluded that banking policy must premier share capital accumulation by MFIs and their close monitor by central banks. However, the author argued that if terms and conditions under which grants are disseminated change to optimal level, grants may have a positive influence on MFI sustainability ,though changing grant's terms may seriously jeopardize short term objectives and intended purposes of grants. While Bogan (2009) and Magali (2012) found the same result that grants erode sustainability.

On the other hand Ravicz, et al(1998) claimed that microfinance initiatives can reduce, and even eliminate the need for subsidies if they achieve a significant volume of business so that they can be sustainable. Bogan (2009) claimed that the negative effect of grants were a particularly meaningful result given that it is consistent with a growing view that MFIs should rely less on grants, soft loans and other types of donor funds. However, many understood that, the negative impact of subsidies was more recognized when many MFIs faced liquidity problems during the financial crises. As rising financial costs and the fluctuations of exchange rates affects MFIs who rely on external finance, many of the MFIs have started to fund at least part of their lending activity by using local savings .This was indeed supported by CédricLützenkirchen (2012) when it found that many institutions were able to achieve high growth rates by retaining profits and by attracting additional funds from commercial sources rather than subsidies. The Deutsche Bank claimed that over time, an increasing share of institutions no longer depended on donations to expand their business, although many MFIs still benefit from them. This has indeed led to the importance of savings on MFI sustainability.

In appreciating the impact of savings on sustainability, Morduch and Haley (2002) also argued that savings help MFIs to achieve independence from donors and investors, which is particularly important in periods of liquidity. Vingo (2012) gave reference to Gozalez and Meyer (2009); Wright and Elser et al., (1999) to understand that deposits are more than half of the total assets reported by financial institutions that have deposit mobilizations

because depositors enjoy certain benefits, such as access to loans constraints. This makes savings a relatively low cost of funds and hence increasing sustainability. This view is also appreciated by Vingo (2012) when he argued that deposits are a relatively stable and low-cost source of funds. He concluded that profitable and regulated microfinance institutions which take on considerably more commercial funds are shown to have higher sustainability which in turn emphasizes the negative impact of subsidies on sustainability.

Therefore, based on these empirical evidences and theoretical reviews, with few empirical exceptions, many of the reviews point to the fact that while subsidies erode sustainability, mobilizing deposits to support loans enhance sustainability.

2.10.2 Cost per borrower

The cost per borrower is defined as the operating expenses divided by an MFI's average number of borrowers. The result of the study made by Yoshi et al (2011), the lower cost per borrower implies that an MFI is more efficient to reduce the borrowing cost.

Therefore, MFIs with a lower ratio have a higher OSS, and negatively related to the FSS and OSS of a given MFI, leading to a negative sign for the coefficient.

The finding by Nyamsogoro (2010), indicates that there is a negative coefficient but statistically insignificant relationship between cost per borrowers and financial sustainability of microfinance institutions in Tanzania. The insignificant effect of the staff cost per borrower on the financial sustainability is contrary to the findings by Woller and Schreiner (2002) they shows that salary levels significantly determines financial sustainability of microfinance institutions. This was also strengthened by the finding of Cull et al (2008) that staff cost per borrowers has a significant effect on the financial sustainability of microfinance institutions.

Based on these and Nyamsogoro (2010) on his finding concluded that the higher staff pay, all things remain constant, could lead them to more leisure than in doing more work for the MFIs‟ main business especial where facilitation for field visit is very low. This can also help to explain why possibly the administrative expenses are positively related with financial sustainability. Furthermore, the results of the study made by Cull et al (2009) and Nyamsogoro (2010) show that a greater cost per unit of loan had significantly negative financial performance of MFIs in India, Ethiopia and Tanzania respectively. However,

Kipesha & Zhang (2013) noted that reduction of cost per borrower enabled cooperatives MFIs in East Africa to attain the financial sustainability.

2.10.3 Number of active borrowers

The study made by Alain et al (2007) confirms the fact that increasing the number of borrowers per MFI would lower the average operating cost and would raise total operating costs less than proportionately with the number of borrowers. This is a clear indication for an increasing the number of borrowers per field officer would raise the sustainability indicators in FSS and OSS.

Alain et al (2007), also indicated on their finding that increasing the number of borrowers per field officer seems to be the most promising way to reduce costs, especially in group-based delivery models.

This would not hurt repayment despite a likely lightening of the monitoring. If scale economies can be found, it is thus primarily by extending the number of borrowers, not by abandoning the depth of the coverage, i.e. not by abandoning the focus on the poor. Therefore, the number of active borrowers influences the operational and financial sustainability of microfinance institutions positively according to this finding. Another result of work by Mersland et al (2007), on the impact of the number of active borrowers indicates there is a notion that implies the existence of positive relationship between the active number of borrowers and the sustainability of microfinance institutions, even though the relationship is not clearly indicated by them.

2.10.4 Debt to Equity ratio

Debt to equity ratio is calculated by dividing total liabilities by total equity. Total liabilities include all the MFI owes to others, including deposits, borrowings, accounts payable and other liabilities. Whereas total equity is total asset less total liability. It is the simplest and best known measure of capital adequacy because it measures the overall leverages of the institutions (AEMFI, 2014).

According to the performance analysis report of AEMFI (2014) the average value of debt to equity ratio of Ethiopian MFIs stood at 204% during the study periods. Moreover, it pointed out, traditionally MFIs' ability to borrow from commercial lenders has been

somehow limited. Based on the mix market website dated July 25, 2015, the average score of debt to equity ratio attained by MFIs of Central Africa, Eastern Africa, western Africa and the entire continent of Africa 4, 3.14, 2.15 and 2.41 Given the average debt to equity ratio scored by these sub African regions, Ethiopian MFIs appeared to score normal result of debt to equity ratio, but still managed to score above the recommended threshold of 150% (AEMFI, 2012).However the maximum debt to equity ratio score of Ethiopian MFIs (11.15) appeared to look very high. Those MFIs scoring maximum DER should be vigilant because theories suggest that higher DER bound to exert pressure on profit margin (sustainability and efficiency).

Studies have been conducted to explain whether the capital structure determines the sustainability of microfinance institutions. Kyereboah (2007), for example, found that highly leveraged microfinance institutions have higher ability to deal with moral hazards and adverse selection than their counterparts with lower leveraged ratio. This states that high leverage and profitability are positively correlated. Bogan et al (2007) conducted a study to ascertain whether capital structure affects the financial sustainability of an MFI. They found that microfinance institutions capital structure were associated with their financial sustainability. The study by Nyamsogoro (2010) indicates that there is a positive correlation coefficient between the capital structure and financial sustainability of microfinance institutions. The more an MFI is equity financed compared to other sources of finance, the more the improvements in its sustainability in other words, although how the capital has been structured affects the financial sustainability (Bogan et al, 2007) having different source of capital does not improve the financial sustainability of microfinance institutions.

The results of a study by Hartarska and Nadolnyak (2007) show that financial performance is affected by the capital ratio, less leveraged MFIs have better operational self-sufficiency (OSS), perhaps, suggesting a link between donors‟ willingness to provide equity to MFIs that do well and prefer to extend loans to those MFIs that slack off. Thus, the result conforms to the notions that MFIs with bigger endowments would be more efficient because they do not need to adjust their mission in order to get additional capital. The research result by Dissanayake (2012) states that, there is strong significant negative correlation in Debt/Equity Ratio (capital structure) to Operational Self Sufficiency Ratio.

This indicates that, change in Debt/Equity Ratio (capital structure) is negatively contributing towards changes in to Operational Self Sufficiency Ratio significantly. In conclusion the researched postulate Debt/Equity is a statistically significant predictor variable in determining operational self-sufficiency and the correlation value between the variables indicates that, the change in the capital structure, negatively contribute towards changes in the operational self-sufficiency significantly.

2.10.5 Return on Asset (ROA)

Return on Asset indicates of how profitable a company is relative to its total assets. It is calculated by dividing net income after taxes and excluding any grants and donation by period average assets. It gives us an idea as to how efficient management is in using its assets to generate earnings. According to Wolday(2013), return on asset is the most common measure of profitability in banks and other commercial institutions. Rosenberg (2009) also stated that return on asset reflects that organizations' ability to deploy its asset profitably. Return on asset measures how well the institution uses all its assets and it is also an overall measure of profitability reflecting both the profit margin and the efficiency of the institutions (Ledgerwood, 1999). Many scholars indicated that is an intuition is best in use of its assets to earn profit, and efficient it is said to be financially viable and financially sustainable. Mohd et al (2014),have made a study on the determinants of performance and financial self-sustainability of Microfinance Institutions (MFIs) in Bangladesh. The study showed that ROA has a positive effect on Operational self-sufficiency and financial self-sufficiency of MFIs.

2.10.6 Loan portfolio

The findings of Magali(2013), shows that sustainability increases as the average loan size increases, indicating that, it is the large size of loans which makes the rural SACCOS sustainable or vice versa. It implies that the large size of loans lowers the operation costs for the rural SACCOS and hence increases the profitability. This result was also confirmed Nyamsogoro (2010) and Quayes (2012) who revealed that large size of loan improves the sustainability of MFI and SACCOS. Similarly, Hermes et al (2008) found out that MFIs that have lower average loan balances were also less efficient. However, Zerai and Rani (2013) found that the correlation between the average loan size and OSS for Indian MFIs

was found to be weak. Additionally, Nyamsogoro (2010) noted that disbursing high volume of loans increases the default risks.

2.10.7 Age of MFI

Based o the study made by Magali (2013) shows that age of SACCOS affect positively the financial sustainability, implying that sustainability favored the aged SACCOS. This is probably because long lived SACCOS's accumulated enough experiences on marketing of their financial products and also had advantages of reduction of costs. This result is in line with Nyamsogoro (2010) who revealed that age of rural MFIs in Tanzania influence positively the financial sustainability. Similarly, Hartarska et al (2011) found out that age of MFI positively influenced the financial sustainability of MFIs worldwide. However, Bogan (2009) found out that age of MFI negatively influenced the sustainability of MFIs; but the influence was not statistically significant. Moreover, Hermes et al (2008) found out that older MFIs are less efficient, hence they might be less sustainable too.

2.10-8 Portfolios at risk (PAR)

The portfolio at risk (PAR) measures indicates how an MFI is efficient in making collections. The higher the PAR indicates low repayment rates, as indication of inefficient microfinance institution. The higher the PAR, the more inefficient the microfinance will be and, therefore, the less financially sustainable. As per the econometric result by Nyamsogoro (2010) indicates, there is a negative relationship between PAR and sustainability of microfinance institutions. This shows that the higher the PAR is less efficient the microfinance institution is and unlikely to be sustainability. Therefore the statistics for the variables indicates that there is insignificant relationship between the two variables.

2.10-9 operating expense ratio (PAR)

The operating expense ratio is defined and described as the ratio of total operating cost to outstanding loan portfolio and thus calculated by dividing all expenses related to the operation of the MFIs (including all the administrative and salary expenses, depreciation and board fees)by the period average gross portfolio, interest and provision expenses (Wolday, 2013). According to the research finding of Nyamsogoro (2010), the lower the

ratio, all things being constant, will imply efficiency and the ratio strongly affects the financial sustainability of microfinance institutions. This indicates that, the more MFIs are efficient in reducing operating costs at a given level of outstanding loan portfolio, the more profitable they become and, therefore, maintain financial and operational self-sufficiency and ensure financially sustainable. Furthermore the findings of Mohd et al.(2014) made on the MFIs of Bangladesh, advocates that the operating expense ratio has negative effect on the financial self-sufficiency and operational self-sufficiency of MFIs and hence the sustainability.

Dissanayake (2012), research on the determinants of operational self-sufficiency of microfinance institutions in Sri Lanka, stated that there is strong significant negative correlation in Operating Expense Ratio to Operational Self Sufficiency Ratio. This indicates that, change in Operating Expense Ratio, is negatively contributing towards changes in Operational Self Sufficiency Ratio significantly.

2.10-10 GDP growth and inflation rates

Most of previous empirical studies focused on those macroeconomic variables are based primarily upon an economic tradition, emphasizing the importance of external market factors in determining a firm's success (Hansen & Wernerfelt,1989); Bogan (2009) and Vingo (2012). Bogan (2009) informed that the common approach is to study the impact of macroeconomic factors by investigating the impact of GDP growth and inflation on performance.

According to a study by from developing countries investigation of average loan size per GNI per capita indicated that macroeconomic variables are significant contributors of performance. In their empirical study Gwas & Ngambi (2014) also tested the influence of macroeconomic indicators -GDP growth and inflation on the sustainability of MFIs. Although statistically not significant, their result showed a negative impact of inflation and a positive impact of GDP growth on the sustainability of MFIs. According to them a positive result of GDP indicated that improving macroeconomic performance raises overall income level and business performance which ultimately improves clients repayment ability and hence sustainability of MFIs. They noted that the negative impact of inflation on sustainability indicated that repayment levels are usually weak and low in the presence of higher inflation rates.

The study made by Ahlin & Lin (2006); Bogan (2009) on the relationship of macroeconomic variables and efficiency, asserted that macroeconomic variables could have an effect on MFI efficiency. Furthermore, Nawaz(2010) indicted that MFIs operating in high income per capita countries do incur higher costs per borrower because of the lower outreach. Vingo (2012) too revealed that cost per borrower tends to increase with the increasing income of households, since the financial products and services of the MFIs may not be appropriate for their financial demands. Therefore, the poor tend to move to commercial banks after being lifted out poverty causing MFIs to left with lower demand of loans. In spite of these, this study believed that high economic growth can help MFIs to benefit from improved repayment rate and can mobilize large volume of savings due to improved household income so that they can reduce the cost acquiring debts and meet the demands of larger loans which ultimately results in reduce cost per borrower.

2.11 Empirical studies and research gap in Ethiopia

The Ethiopian microfinance sector is characterized by its rapid growth, an aggressive drive to achieve scale, a broad geographic coverage, a dominance of government backed Microfinance Institutions (MFIs), an emphasis on rural households, the promotion of both credit and savings products, a strong focus on sustainability and by the fact that the sector is Ethiopian owned and driven (Ebisa et al. 2013).Therefore, most large and medium MFI in Ethiopia are attached and supported by the regional government as well as national and international NGOs. The question is what is the future of these MFIs when the donations and supports are over? Regarding this concept and issue, Randhawa and Gallardo (2003) posit that it does not seem likely that most MFIs will be able to sustain their operations without continued donor support for funding and technical assistance.

This leaves the future of the microfinance institutions in uncertainty. Thus an important question here is what should be done to make these MFIs sustainable and hence ensure sustainable provision of microfinance services and sustainable poverty reduction through outreach. The first step in doing this is to understand the factors affecting their operational and financial sustainability (Melkamu Woldeyes, 2012).

Several studies have been conducted to determine the factors affecting financial and operational sustainability of MFIs in different countries. However, the level of significance

of these factors in affecting the operational and financial sustainability of MFIs varies with studies and countries. While some of the determinants are found to be significant in one country or economy or MFI, they may not be significant for others (Cull et al, 2007; Woller and Shcreiner 2002; Christian et al, 1995).

Even though, the topics, scopes, comprehensiveness and depth vary, of Empirical studies have been conducted in Ethiopia in relation to the microfinance industry. To mention few of the researches conducted on the area of MFIs,: Tilahun (2013) has done his research on the,determinants of Financial Sustainability of Microfinance Institutions in East Africa, by including the Ethiopia, and he included Loan portfolio, size and management efficiency as significant determining factors for financial sustainability of East African MFIs including Ethiopia. This study clearly fails to include more determining factors for financial sustainability of MFIs in Ethiopia.

A study made by Melkamu (2012) on determining factors for operational and financial self-sufficiency of Ethiopian MFIs, he considered Yield, size, personnel productivity ratio, debt to equity ratio, cost per borrower, average loan per borrower and age of MFI as explanatory variables for the OSS. Yield, cost per borrower, liquidity ratio, number of active borrowers, operational expense ratio and age as the determining factors for FSS of MFIs in Ethiopia. The study found that average loan balance per borrower, size of a MFI, cost per borrowers and yield on gross loan portfolio affects the operational sustainability of Ethiopian MFIs significantly and cost per borrower, number of active borrowers and yield on gross loan portfolio affect their financial sustainability.

Other more empirical studies by Kereta in (2007), Asnakew (2012), Yirsaw (2008), Melkamu (2012) and Yenesew (2014) have been done in various periods on different research topics of MFIs in Ethiopia. Even though, few exceptions exist, most of these studies focused on MFI profitability, outreach and sustainability with limited explanatory variables and by excluding the effect of macroeconomic variables on Ethiopian MFIs sustainability.

Kereta (2007) studied the industry's outreach and financial performance using descriptive analysis, using graphs and percentage growth rates. The result of his study showed that in terms of breadth of outreach. The same study noted that MFIs are operationally sustainable as measured by ROA and ROE and the industry's profit performance is improving

overtime. The use of these proxies (ROA and ROE) by Kereta (2007) and others for sustainability measurement were contrary to earlier studies made on MFIs sustainability such as, Mohd (2014);Gibson (2012); Bogan (2009); Kimando et al.(2012); Rahman & Mazlan(2014) and other scholars who used financial self-sufficiency , and operational self-sufficiency ratios which are described as adjusted revenues as a percent of adjusted expenses and the ratio of financial revenue as financial expense, impairment expenses and all other operating expenses respectively better explains financial sustainability of MFIs than ROE and ROA due to their long term perspective in measurement of sustainability.

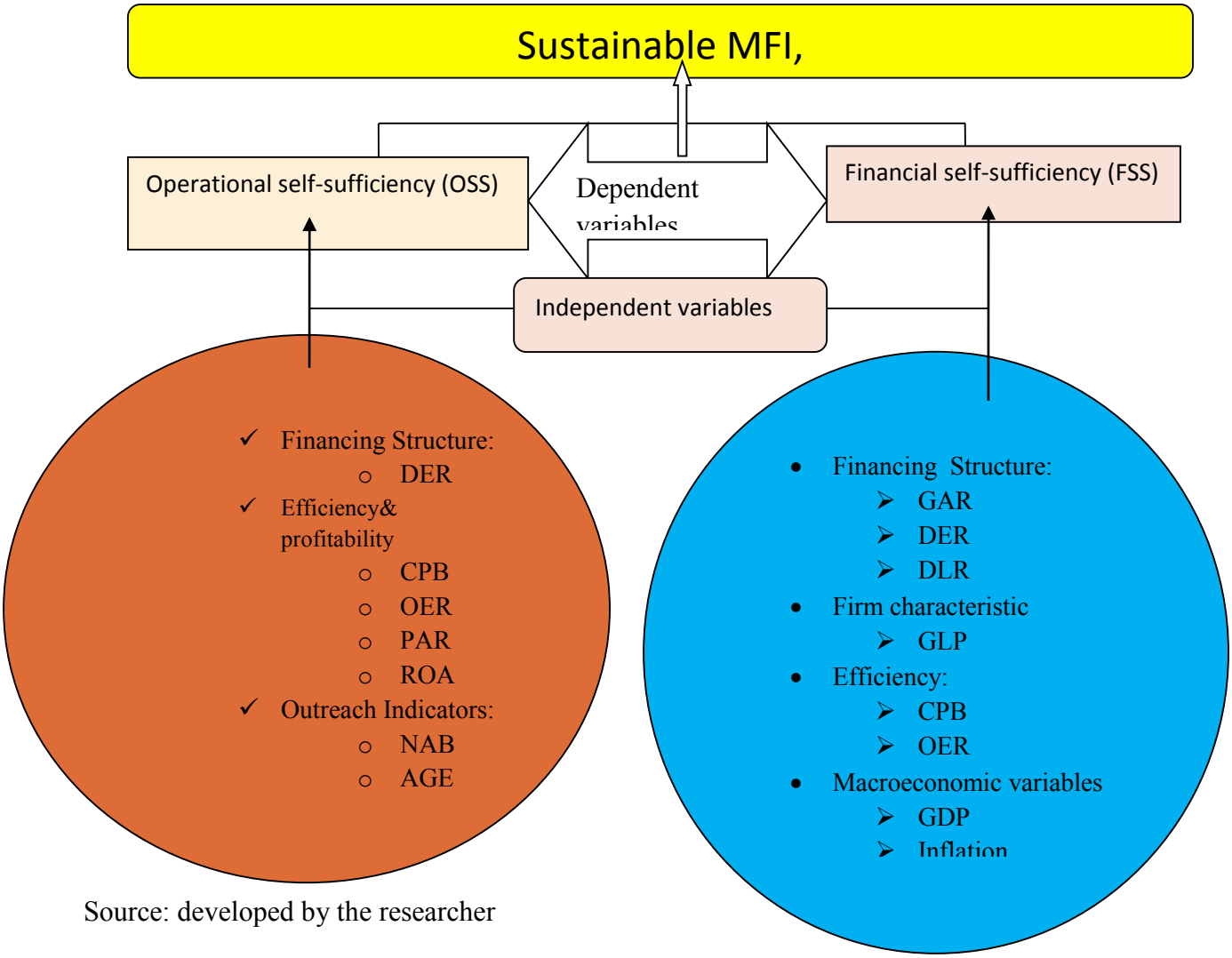
Yenesew (2014) studied determinants of financial performance on selected micro finance institutions in Ethiopia and tried to incorporate different variables from different perspective which is wider analysis of the MFIs performance than the earlier ones. But, the research mainly focused on profitability rather than sustainability by taking ROA as a dependent variable which is contrary to proxies used by many researchers as mentioned above. Melkamu (2012) has excellent analysis of MFIs by using proxy of financial and operational sustainability, however he entirely focused on internal factors such as loan size and number of active borrowers leaving crucial variables in the case of Ethiopia such the influence as of some components of MFIs' funding sources (subsidies) and the number of borrowers and the impact of macroeconomic variables such as GDP and inflation.

Therefore, to the best knowledge of the researcher, even though tremendous has been undertaken on the sustainability, efficiency, performance development and other topics in relation to of MFIs in Ethiopia, there is no comprehensive study on the determining financial factors for the sustainability of Ethiopian MFIs, by using proxies' financial self-sufficiency and operational self-sufficiency. As described by various parts of this research and explained by many researchers, the researcher uses OSS and FSS to measure the sustainability of Ethiopian MFIs, and used GAR, DER, CPB, GDP, INF, OER, DLR, and GLP as independent explanatory variable for FSS. On the other hand, the researcher considers ROA, Experience /age, CPB, NAB, PAR, OER and DER as explanatory variables for OSS. Therefore, this study is aimed to narrow the knowledge gap about the significant financial determinant factors of sustainability of Ethiopian microfinance institutions by considering FSS and OSS as a proxy and by taking more explanatory financial variables and macroeconomic variables.

2.12 Conceptual Framework of MFIs sustainability

The Ethiopian microfinance sector is characterized by its rapid growth, an aggressive drive to achieve scale, a broad geographic coverage, a dominance of government backed Microfinance Institutions (MFIs), an emphasis on rural households, the promotion of both credit and savings products, a strong focus on sustainability and by the fact that the sector is Ethiopian owned and driven (Ebisa, 2013). Further to this, government has put its eye to microfinance institutions in its GTP to achieve the millennium development program. Therefore, given the broad role and objectives of MFIs, they have to serve, the target group successfully with continuity, with better efficiency and capacity, the MFIs themselves should exist sustainably. Therefore, the following conceptual framework will help the MFIs to understand on the financial determining areas for their sustainability.

Figure 2.1 Conceptual framework



Source: developed by the researcher

Chapter Three

3. Research design and methodology

This particular chapter of the study starts with the description of research type, approach (design), and followed by describing the target population, sample size and sampling technique, source of data and methods of collection. Finally definition of variables, model specification and data analytical tools will be presented.

3.1 Research type and design

The main objective of this study was to assess the determinants of financial and operational sustainability of MFIs Ethiopian, by taking operational self-sufficiency and financial self-sufficiency as a proxy. Hence, with the aim of assessing determinants of financial sustainability this study is a quantitative research by its nature. The longitudinal research design with panel data has been employed to analyze the resulting estimates and to properly address the hypothesized research questions. As stated by Melkamu (2012) using longitudinal research design, believed to have three advantages: first it shows individual level changes in the variables, second it establishes time order of variables, and third it can show how relationship emerges between variables.

Furthermore, as stated by various researchers and scholars, a quantitative panel data is considered as more informative, has more variability, with less linearity among variables, more degrees of freedom and hence more efficiency. Moreover repeated cross section of observations with a range of years is of a better fit to study the dynamic of change of variables, detect and measure effects that are simply difficult to be observed in pure cross-section or pure time series data.

3.2 Research methodology

To assess the significant determinants of financial and operational sustainability of Ethiopian microfinance institutions, a multiple regression models have been employed. Operational Self-Sufficiency and Financial Self-Sufficiency ratios have been used as the dependent variables to measure the self-sufficiency (sustainability) of microfinance institutions in Ethiopia. The researcher extracted various predictor or explanatory and independent variables from different studies to measure the financial sustainability of MFIs in Ethiopia.

Accordingly, eight predictor /independent or explanatory variables, namely; grant to asset ratio (GAR), debt to equity ratio (DER), operational expense ratio (OER), cost per borrower (CPB), GDP growth rate, inflation rate, deposit to loan ratio (DLR) of MFI, and gross loan portfolio (GLP) of MFIs have been used in the model to measure and predict the financial self-sufficiency of MFIs in Ethiopia. On the other hand to measure the predictor variables of operational self-sufficiency, seven independent explanatory variables namely: return on asset (ROA), experience/age of MFI, cost per borrower (CPB), number of active borrowers (NAB), portfolio at risk (PAR), operating expense ratio (OER), and debt to equity ratio (DER) of an MFI has been considered.

3.3 Data type, Source and data collection techniques

To assess the determinants for the financial and operational sustainability of microfinance institutions in Ethiopia, the researcher has gathered and used a secondary data from various sources. Accordingly the secondary data specific to MFIs has been taken from annual reports of the Association of Ethiopian Micro Finance Institutions (AEMFI) and complemented with data extracted from the Mixmarket website. Whereas, the data related to the macroeconomic factors were collected from the National Bank of Ethiopia (NBE), Ministry of Finance and Development (MoFED), MixMarket and the website of World Bank. To enhance the quality of econometric estimates and to preserve consistency, only the most available MFIs' audited data are collected from the fiscal years 2003 to 2012 (but issued from 2005 to 2014 respectively) which are available in the annual reports of AEMFI and effectively constituted 10 years data.

3.4 Target Population

According to the recent recorded data extracted from the NBE website, there were 31 microfinance institutions operating in the country by the end of year 2012. Accordingly the target population considered by the researcher is all the 31 microfinance institutions which were providing the microfinance service to the target group by the end of year 2012.

3.5 Sample size and sampling design

The researcher considered 13 microfinance institutions out of the total population of MFIs. Hence, included in the study is the 13 MFIs 10 year's data which were audited for the year 2003 to year 2012 and published in the AEMFI annual report from year 2005 to year 2014. Therefore, this provides a total 130 (13MFIs *10years) observation, which is indeed well

enough to do a fixed effect regression in which a minimum of 95 observation is recommended by many researchers.

For regression models, such as, ANOVA, GLM, etc. the recommended minimum sample observation should be 50+8k, to adequately test an overall model and 104+k to adequately test for each predictor of a model, where k is the number of predictors in the model. Therefore, according to the model 50+8k, the total observation of 130 to be considered in this study will be above, minimum required observation of 114 (50+8*8 independent variables) and 106 (50+8*7 independent variables) for each predictor variable.

The researcher believes that, collecting data from each MFI is costly and time taking and hence, the sample size be judged based on the availability and quality of data and the resulting estimates. Accordingly, the researcher took those MFIs who consistently provide their audited data to AEMFI, and available as well in MixMarket website over the 10 years period considered in the data scope. Wisdom, ADCSI, AVFS, PEACE, ACSI, Buusaa Gonofaa, DECSI, Meklit, OCSSCO, OMO, Gasha, SFPI and Wasasa are the MFIs taken as a sample from the total target population.

3.6 Operational definitions

The dependent variable in this study generally is the sustainability of microfinance institutions which is measured by the financial self-sufficiency and operational self-sufficiency. Financial self-sufficiency is measured as the ratio of adjusted financial revenue to adjusted operating expenses, which are summarized with the following measurements (formula) (AEMFI, 2014). On the other hand the operational self-sufficiency is computed as the ratio of unadjusted operating income to operating expenses (the ratio of operating income to the sum of administrative expenses, loan losses and interest expenses) (IBID).

3.7 Dependent Variables

- **Operational self-sufficiency =**
  Financial revenue/ (Financial expense+ Impairment losses + Operating expenses)

- **Financial self-sufficiency =**
  Adjusted financial revenue/ (Financial expense+ Loan loss provision + Operating expenses + Expense adjustment)

3.8 Independent variables

In this study, Grant to asset ratio (GAR), Debt to Equity ratio (DER), operational expense ratio (OER), cost per borrower (CPB), GDP growth rate (GDP), Inflation (INF), deposit to asset ratio (DLR), and gross loan portfolio (GLP), has been considered as the independent variables to determine the factors affecting financial self-sustainability of MFIs in Ethiopia. On the other hand, the independent variables to measure the predictor operational self-sufficiency, the researcher considered; return on asset (ROA), age of an MFI experience (Age), cost per borrower (CPB), Number of active borrowers (NAB), portfolio at risk (PAR), operating expense ratio (OER), and debt to equity ratio (DER) of MFIs. The following table presents the standard name, description of the independent variables or explanatory variables, the variable name in regression model, variable description to be used in the regression model and the researcher expected effect of the independent variables for both the OSS and FSS dependent variables used in the research. Some of the variables will be presented in their natural log form for regression purpose.

Table 3.1 Description of independent variables for both FSS and OSS

S.N	Variable Standard Name	Description	Variable name in regression	Variable Description as used in regression model	Expected effect
1	Grant to asset ratio	The ratio of total grant to total asset	GAR	Debt as a proportion of asset	_
2	Debt to Equity Ratio	Adj. Total Liabilities/Adj. Total Equity	DER	Debt as a percentage of Equity	_
3	Cost Per Borrower	Adj. Operating Expense/Adj. Av. No. of Active Borrowers	lnCpB	Natural logarithm of the cost per borrower	_
4	Number of Active Borrowers	Number of active borrowers with loans outstanding	NAB	the number of active borrowers	+
5	Operating Expense Ratio	The ratio of operating expense to the gross loan portfolio	OER	Operating expense ratio	_
6	Return on Asset	Net operating income-taxes/Period average assets	ROA	Ratio of NI as a percentage of period average asset	+
7	Gross loan portfolio	Gross loan portfolio of MFI	LnGLP	Natural logarithm of the gross loan portfolio	+
8	Experience	Age of an MFI	Exp	Experience of an MFI	+
9	GDP growth rate	GDP growth rate of the country	GDP	Percentage of the GDP growth rate	+

10	Inflation Rate	The inflation rate of the country	INF	The inflation rate as a percentage	_
11	Portfolio at risk	Outstanding balance of all loans with arrears over 30 days plus all refinanced loans/outstanding gross portfolio as of specific date	PAR	Outstanding balance of all loans with arrears over 30 days plus all restructured loans as a ratio of outstanding gross portfolio	-
12	Deposit to loan ratio	All deposits divided by outstanding loan	DLR	The ratio of deposit to outstanding loan	+

***Source**: adapted from different theoretical reviews and empirical evidences*

Accordingly, the researcher expected that NAB, ROA, GLP, the GDP growth rate, DLR to have a positive significant impact on the FSS and OSS, hence on sustainability of Ethiopian MFIs. On the other hand; GAR, DER, CPB, OER inflation, and PAR are expected to have a negative significant impact on the FSS and OSS of MFIs.

3.9 Model specification

In addition to using a descriptive statistics, the researcher has applied two separate multiple regression models to analyze the sustainability of MFIs in Ethiopia. Many econometricians argued that one of the most useful aspects of a multiple regression model is its ability to identify the independent effects of a set of variables on a dependent variable. The study tests the impact of funding, firm characteristics, and macroeconomic variables on sustainability. Hence this study involved two dependent variables and 15 independent variables for testing against each of these two dependent variables. As per the recommendations of many studies and suggestions of many econometricians, the balanced panel data set has been used by the researcher, as it allows an observation of the same unit in every time period and avoids/reduces the problem of unit heterogeneity(Brooks, 2008). The researcher has adopted the models from the study made by Melkamu (2012) and Mayer (2002) with modification for the explanatory variables for both FSS and OSS models.

3.9.1Model estimation of financial self-sufficiency for sustainability

To test whether the financial self-sufficiency of MFIs is explained by the independent variables namely; Grant to asset ratio (GAR), Debt to Equity ratio (DER), operational expense ratio (OER), cost per borrower (CPB), GDP growth rate (GDP), Inflation (INF), deposit to loan ratio (DLR), and gross loan portfolio (GLP). The following regression model is estimated to carry out industry wide analysis.

$$\mathbf{FSS}_{it}= \beta o+ \beta_1\mathbf{GAR}_{it}+ \beta_2\mathbf{DER}_{it}+ \beta_3\mathbf{OER}_{it}+ \beta_4\mathbf{log(CPB)}_{it}+ \beta_5\mathbf{GDP}_{it}+ \beta_6\mathbf{INF}_{it}+ \beta_7\mathbf{DLR}_{it}+\beta_8 \mathbf{log\ (GLP)} +\varepsilon_{it}$$

Where FSS_{it} is the observed financial self-sufficiency of an MFI i at year t,

β_0 is the constant term showing the value of FSS, when all the coefficient of the independent variables are zero,

GAR_{it} is grants to assets ratio of an MFI i at time t,

DER_{it} is the debt to equity ratio of an MFI i at time t,

OER_{it} is the operating expense ratio of an MFI I at time t,

CPB_{it} is cost per borrower of an MFI i at time t,

GDP_{it} is the GDP growth rate of Ethiopia assigned to an MFI i at time t,

INF_{it} is the rate of inflation of Ethiopia assigned to an MFI i at time t, and

DLR_{it} is the deposits to loan ratio of an MFI i at time t,

GLP_{it} is the gross loan portfolio of an MFI i at time t,

βs are the partial effect of independent variables in period t.

ε_{it} is the error term of an MFI i at time t.

3.9.2 Model estimation of operational self-sufficiency for sustainability

To test whether the operational self-sufficiency of MFIs is explained by the independent variables namely; return on asset (ROA), age of an MFI experience (age), cost per borrower (CPB), Number of active borrowers (NAB), portfolio at risk (PAR), operating expense ratio (OER), and debt to equity ratio (DER) of MFIs, the following regression model is estimated to carry out industry wide analysis.

$$\mathbf{OSS}_{it}=\beta_0+\beta_1\mathbf{RoA}_{it}+\beta_2\ \mathbf{Exp}_{it}+\beta_3\mathbf{CPB}_{it}+\beta_4\mathbf{NAB}_{it}+\beta_5\mathbf{PAR}_{it}+\beta_6\mathbf{OER}_{it}+\beta_7\mathbf{DER}_{it}+\ \varepsilon_{it}$$

Where:

OSS_{it} is the operational self-sufficiency ratio (dependent variable) of an MFI i at period t,

β_0 is a constant term; $\beta_{1\text{-}n}$ measures the partial effect of independent or explanatory variables 1-n for period *t,*

ROA_{it} is the return on asset ratio of an MFI i at time t,

Exp_{it} is working experience of an MFI i at time t,

CPB_{it} is the natural logarithm value of cost per borrower of an MFI i at time t,

NAB_{it} is the natural logarithm number of active borrowers of an MFI i at time t,

PAR_{it} is the the portfolio at risk ratioof an MFI i at time t,

OER_{it} is the natural logarithm of gross loan portfolio of an MFI i at time t,

DER_{it} is the debt to equity ratio of an MFI i at time t,

ε_{it} is the error term

3.10 Data analysis

The panel data collected from the AEMFI annual bulletins, and various websites are managed in the form of ratios, percentages and natural logarithmic forms. These panel data has been regressed and interpreted by using multiple regression method and descriptive statistic. To enhance the strength of the models, to minimize the cross section effects of the intercepts the study will employ a fixed effect regression technique. According to Brooks (2008) the simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionally. The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics.

The researcher checked whether the proposed empirical models are free from the assumptions of autocorrelation, multicollinearity, heteroskedasticity and normality. A violation of key assumption of OLS regression occurs if any one of those assumptions turns out to be present. Redundant fixed effect test is also made to ensure that a fixed effect regression technique is appropriate. Eviews8 software has the ability to help researchers to analyze their research data easily and efficiently. Therefore, as recommended by Brooks (2008) the researcher used Eviews8 software to analyze and interpret the given panel data.

CHAPTER FOUR

4.1 Data presentation and discussions

This chapter presents the findings of the study in two sections. Under the first section, the descriptive statistics of both the dependent and independent variables are discussed separately. The second section presents the econometric result in which the explanatory variables are checked whether they determine the sustainability of MFIs.

4.2 Descriptive statistics for the dependent variables

Sustainability can be defined as a program's capacity to remain financially viable in the absence of domestic subsidies or foreign support (Woolcock, 1999). The two kinds of sustainability (financial self-sustainability and operational self-sustainability) that can be observed in assessing MFIs performances, according to Mayer (2002) and the proxies used by Melkamu (2012) have been used as dependent variables in this study. The value of one and above for both variables (FSS and OSS) indicates that the microfinance institutions are financially and operationally self-sufficient and confirms their sustainability. Whereas, the value below this point indicates they are not sustainable. Table 4.1 on page 66 below indicates the descriptive statistics for the dependent variables: financial self-sufficiency (FSS) and operational self-sufficiency (OSS).

4.2.1 MFIs Financial Self Sufficiency (FSS): As described in the earlier chapters financial sustainability is defined as the MFIs' ability to cover all costs on adjusted bases and indicates MFIs' ability to operate without ongoing subsidy (i.e. including soft loans and grants). The adjustment to this ratio goes to inflation, loan loss provisioning and cost of funds. This study utilized Financial Self-Sufficiency as proxy to measure financial sustainability which in turn measured by adjusted revenues as a percent of adjusted expenses. The approach is being applied by many regulators and MFIs' associations around the world including AEMFI in the assessment of their MFI's performance. As noted by empirical study section of this study, unless FSS ratio of 100% (1) is reached, the long-term provision of credit services is undermined by the impact of inflation and the continued necessity to rely on donor funds. Analysis of descriptive statistic from Table 4.1 revealed that the mean values, the maximum values, the minimum values and the standard deviations MFIs' FSS observations are 94%, 176%, 10% and 32% respectively.

Given the international requirement of an FSS ratio of 100%, the mean score of 94% indicated that most of Ethiopian MFIs are not financially self-sufficient. It is difficult for these MFIs, with an FSS ratio below 100%, to cover all costs and to operate without ongoing subsidy. In this case, equity will be reduced by losses, forced them to rely on grants or concessional loans from external sources.

On the other hand the most successful MFIs with maximum score of 176% could minimize the need for subsidies and concessional loans of low interest rates from donors.

The standard deviation (32%) revealed in this study was very low as compared to related findings around the world and related studies in Ethiopia. For example, in Bogan (2009) study FSS ratios of MFIs had standard deviation of just above 45%. Lower standard deviation is a good indication that most of the observations are concentrated around the mean.

Comparison of Ethiopian MFIs' FSS ratio with the FSS ratio of MFIs in the entire continent of Africa indicated, as revealed by MixMarket (2011), that the mean FSS score of the African MFIs was 98% which is marginally higher than the mean score of Ethiopian MFIs. The same source indicated that MFIs operating in eastern African and southern African regions had a mean score of an FSS ratio of 99.1% and 97.6% respectively and indicating that they are out-performing Ethiopian MFIs .However on the average none of the MFIs in these region are financially sell sufficient as their mean score was marginally below 100%.

4.2.2 MFIs Operational Self-Sufficiency (OSS)

Operational self-sufficiency (OSS) requires MFIs to meet all administrative costs and loan losses from operating income which is measured by dividing operating income by operating expenses.

As indicated on the above paragraph, the operational self-sufficiency (OSS) indicates the sufficiency of operating income to cover operational costs like salaries, suppliers, loan losses, and other administrative costs. Therefore, based on the above table the mean, median, maximum, minimum and standard deviation of MFIs operational self-sufficiency is 134%, 129%, 244%, 61% and 43% respectively for the total number of 130 observations. This shows that, on average the operational sustainability of MFIs under consideration is 134%. This is beyond the threshold for sustainability. Thus, we can infer from this that Ethiopian microfinance institutions are operationally sustainable. An operational self-

sufficiency of 1 (100%) is the first stage that an institution should reach in its way to long term financial viability (Berne, 2005).

According to Berne, if an MFI does not reach that, eventually its equity will be reduced by losses or must be compensated by grants. But this is not the case as per this figure for mean. The standard deviation for this variable is (43%), indicating that the variation in the operational sustainability of microfinance institutions under consideration is 43%. Therefore, as the variation or dispersion of the sustainability indicates, all of the microfinance institutions under consideration are somewhat close to average. Based on this we can infer that the result for the population that the operational self-sufficiency of Ethiopian microfinance industry on average is 134%, which is beyond the requirement.

Table 4.1: Descriptive statistics for dependent variables

	Financial Self-Sufficiency ratio	Operational Self-Sufficiency ratio
Mean	94%	134%
Median	91%	129%
Maximum	176%	244%
Minimum	10%	61%
Std. Dev.	32%	43%
Observation	130	130

Source: Author's Eviews descriptive statistics output for dependent variables, 2015.

4.3 Descriptive statistics for the explanatory variables

Under this section the descriptive statistics of the explanatory variables are presented. All the explanatory variables, expected to have an impact on the financial self-sufficiency and operational self-sufficiency, have 130 numbers of observations in total.

Table 4.2: Descriptive analysis for both explanatory variables of FSS and OSS

Variable	Mean	Median	Maximum	Minimum	Std.Dev.	Observation
GAR	23%	17%	90%	0%	20%	130
DER	1.93	1.30	9.90	1	1.71	130
CPB	154	133	929	36	116.5	130
INF	17%	13%	36%	2.8%	11%	130
GDP	11%	11%	12.6%	8.8%	1.1%	130
DLR	24%	24%	70%	0%	16.9%	130
GLP	300mil	45.2mil	3010mil	1.8mil	541mil	130
ROA	.01%	1.5%	23%	-78%	9%	130
Exp	9	9	15	2	3.18	130
NAB	134037	36262	784541	2866	191734	130
PAR	5%	3.3%	26%	0%	5%	130
OER	0.09	0.09	0.26	0.01	0.056	130

Source: Author's own Eviews descriptive statistics output for explanatory variables, 2015.

4.3.1 Grants to Asset Ratio (GAR)

As indicated in Table 4.2, the mean score of GAR showed that average MFIs in Ethiopia maintained donated equity of 23% in its total assets. This is higher than the mean value of the same ratio revealed in Bogan's (2009) study in which case the ratio was 13.61.This indicated that the assets of the average Ethiopian MFIs are relatively financed more by subsidies than commercial sources. On the other hand highly subsidized MFIs in Ethiopia maintained grants as high as 90% of their total assets. This will make Ethiopian MFIs in state of high dependency risk as the availability of funds becoming uncertain. The table

also depicted that only 20% of GAR observations deviate from the mean. The standard deviation of Ethiopian MFIs for GAR is lower than the departures observed for MFIs in Bogan's study (28%) indicating that much of the GAR observations of Ethiopian MFIs are concentrated around the mean.

4.3.2 Debt to Equity Ratio (DER)

Debt to equity ratio is the simplest and best known measure of capital adequacy because it measures the overall leverage of the institution (AEMFI, 2014). The mean value of DER of Ethiopian MFIs stood at 1.93 during the study periods. Moreover, as AEMFI (2014) pointed out, traditionally MFIs' ability to borrow from commercial lenders has been somehow limited.The average score of DER attained by MFIs of Central Africa, Eastern Africa, western Africa and the entire continent of Africa 4, 3.14, 2.15 and 2.41 respectively (Mix Market, 2011).Given the average DER scored by these sub African regions, Ethiopian MFIs appeared to score normal DER but still managed to score above the recommended threshold of 1.50(AEMFI, 2012). However the maximum DER scores of Ethiopian MFIs 9.90 appeared to look very high, indicating that debt financing is more considered instead of having proportional financing structure, therefore highly leveraged.

4.3.3 Cost per borrower

Cost per borrower provides a meaningful measure of efficiency, showing the average cost of maintaining an active borrower of an MFI. As demonstrated so far cost per borrower, the most popular measure of MFIs efficiency, is calculated by dividing all expenses related to the operation of MFIs (including all administrative and salary expenses, depreciation and board fess) by average number of active borrowers. Since the size of the loans is not the part of the denominator, institutions with larger loans do not automatically appear to be more efficient. For example if the cost per borrower ratio takes loan amounts rather than average number of active borrowers, it could bias smaller MFIs which offer smaller loans and savings accounts to appear less efficient (AEMFI, 2014;CGAP,2003).

While cost per borrowers used in the FSS regression model are transformed to their natural logarithm value, the analysis of its descriptive statistic is made based on its actual values .The descriptive statistic in table 4.2 revealed that the mean value, the maximum value and the minimum values of the cost per borrower were found to be Birr 153.9, Birr 929, Birr 36 .This indicated that the average MFIs incurred a cost of Birr 153.88 to maintain a single borrower. While the most efficient MFIs incurred a cost per borrower of Birr 36, inefficient MFIs incurred a cost per borrower as high as Birr 929 during the study period.

The mean, maximum and minimum scores of MFI's cost per borrower of MFIs in Ethiopian which were Birr 153, Birr 929 and Birr 36 are changed to their dollar values of $13.93, $84.14 and $3.26 respectively to make comparison against empirical evidences[1]. A handful of studies indicated that the average Ethiopian MFIs appeared to look more cost efficient than MFIs in the rest of the world. For example Nawaz (2010) has found that the mean score of cost per borrower of 179 MFIs worldwide was $131 .The maximum score of cost per borrower of Ethiopian MFIs revealed in this study was also well below the maximum score revealed in Nawaz's study ($1694).

On the other hand Bogan (2009) operated panel data on MFIs in Africa, East Asia, Eastern Europe, Latin America, the Middle East and South Asia during the year 2003 through 2006

[1] Calculated by dividing "cost per borrower of Ethiopian MFIs" by" average exchange rate" during the study period. According to the National Bank of Ethiopia, the average exchange rate during the study period was Birr 11.04 (NBE Annual reports from 2003 to 2012).

and revealed that the mean score of cost per borrower of MFIs in these regions was $178 indicating that Ethiopian MFIs on the average are more efficient than MFIs in these regions. MixMarket (2011) revealed that the average cost per borrower for MFIs in Central Africa, Eastern Africa, Southern Africa, Western Africa and the whole Africa were found to be $15, $149, $182, $103 and $137 respectively making Ethiopian MFIs more efficient in maintaining a single borrower. Lower cost per borrower for Ethiopian MFIs may point to the fact that the difference in macroeconomic environment among regions may also play an important role. For example clients of MFIs in countries of higher GNI per capital may require better, quality and additional services which could increase operating expenses.

4.3.4 GDP and inflation

The mean value of GDP and inflation were found to be 10.9% and 17% and both are higher than the average of the entire African continent which was 3.8% and 9% in Mix Market's report (2011). The growth in GDP during the last 10 years intuitively believed to help MFIs to display extraordinary expansionary rates. However the inflationary environments displayed by double digit trends were reflected in MFIs performance indicators (AEMFI, 2009). The increased inflationary trends may have a negative effect by eroding the real value of MFIs' equity.

4.3.5 Deposit to Loan Ratio (DLR)

Deposit mobilization represented by deposits as a percent of loan measures the portion of the MFIs portfolio funded by deposits. The higher the ratio, the greater is the MFIs' capability to fund its loan portfolio from deposits. The mean value showed that 24% Ethiopian MFIs loan portfolio has been financed by deposits. This indicated that 76 % of the loan portfolio is financed by other means such as borrowing, soft loans and grants.

Comparison of this ratio with other jurisdiction indicated that MFIs in Central Africa, Eastern Africa, Southern Africa , Western Africa and the entire continent of Africa have mean score of DLR 154.8%, 48.6%,30.5%, 59.5% and 154.8% respectively indicating that MFIs in these regions have mobilized higher commercial sources (savings) to finance their loan than MFIs in Ethiopia (MixMarket ,2011).This enables these Subs Saharan African MFIs to mobilize a cheaper source of funds than debts to finance their loans so that they can reduce the need of subsidies.

4.3.6 Gross Loan Portfolio (GLP)

As a measurement of MFI's scale of operation, the mean, the maximum and the minimum scores of gross loan in the industry in real terms stood at Birr 300mln, Birr 3bln and Birr 1.8mln. To minimize the size effect of departure of the observations from the mean, gross loan sizes are considered with their natural logarithm terms.

Comparison of gross loan portfolio with other jurisdiction has revealed that on average Ethiopian MFIs provided a gross loan size of $27.2million .This is much higher, as reported MixMarket (2011), than the mean score of African MFIs ($4.4). However loans in Ethiopia are backed by relatively low volume of deposits as compared to MFIs in other regions. On the other hand according to a study by D'Espallier et al (2009), the average MFI in the globe has a total loan portfolio of $ 4.1million. Thus Ethiopian MFIs on the average can be categorized in to large scale MFIs.

4.3.7 Return on Asset (ROA)

Return on Asset indicates how profitable a company is relative to its total assets. It is calculated by dividing net income after taxes and excluding any grants and donation by period average assets. It gives us an idea as to how efficient management is in using its assets to generate earnings. According to Wolday (2013), return on asset is the most common measure of profitability in banks and other commercial institutions. Rosenberg

(2009) also stated that return on asset reflects that organizations' ability to deploy its asset profitably. Return on asset measures how well the institution uses all its assets and it is also an overall measure of profitability reflecting both the profit margin and the efficiency of the institutions (Ledgerwood, 1999). From table 4.2 Ethiopian MFIs have an average return on asset of .01, indicating that they earn 0.01 birr on a 1 birr asset they invested. And the maximum and minimum return on asset is 0.015 and -0.78 birr respectively. This indicates that there are MFIs either running on a loss or operation with idle capacity.

4.3.8 Experience (AGE)

Experience shows the time frames (duration) in which the microfinance institutions have been providing services during each observation was taken starting 2003 first year observation. That indicates the number of experience in terms of year when a specific year data is taken. The mean value for this variable shows that MFIs in Ethiopia have served for 9 years in real term on average. For the life cycle definitions ,this study utilized standard benchmarks applied by Bogan (2009), that is for new (0-4 years), young (5-8 years), and mature (>8 years) MFIs. Thus according to this benchmark on the average Ethiopian MFIs can be considered mature with the mean score of 9 years .While mature MFIs have a maximum experience of 15 years and young MFIs have a minimum age of two years, i.e. the minimum experience or age of MFIs when the data was first collected was 2 years. MFIs in Central Africa, Eastern Africa and western Africa region have an average age of 13,11 and 12 years indicating that the MFI sector in those region is older than the MFI sector in (MixMarket,2011) .

4.3.9 Number of active borrowers (NAB)

Is a measure of breadth of outreach, which means the number of poor served by a microfinance institution (Woller and Schreiner, 2002). It is generally assumed that the larger the number of borrowers the better the outreach and thus, it leads an MFI to become more sustainable. The mean statistics for this variable is 134,037. This indicates on average a microfinance institution in Ethiopia is reaching 134,037 numbers of borrowers. The maximum numbers of borrowers reached so far by a microfinance institution in the industry is 784,541 borrowers and the minimum is 2,866. However, when we see the industry average that an MFI is reaching, it is still very low as compared to the number of population

in the country. Not only this, but also when this number is compared to the income level of the society, it still needs attention to reach more poor in the country.

4.3.10 Portfolios at risk, loans outstanding past due 30 days or more (PAR)

Loan portfolio is the dominant asset of MFIs. Portfolio quality reflects the risk of loan delinquency, determines future revenues and an institution's ability to increase outreach and serve existing clients. A higher ratio brings higher risk to the portfolio. As indicated above the portfolio quality is low as PAR>30 stood at a mean score of 5%. This is a little bit lower than the mean score of east Africa region and west Africa region were the ratios was were at 8.3% and 5.9% respectively. Generally speaking any portfolio at risk (PAR) exceeding 10% should be cause for concern (AEMFI, 2011). Hence, Ethiopian MFIs are relatively at a lower risk of loan delinquency.

4.3.11 Operating expense ratio (OER): OER, according to CGAP (2009), is the most commonly used measure of microfinance efficiency. It measures how an MFI's management has been efficient in reducing operating costs at a given level of operation. The lower the operating expense ratio will indicate efficiency in microfinance institutions cost reduction strategy. The operating expense ratio for the Ethiopian microfinance industry shows 0.09 in its mean. This indicates that on average they are incurring 9 cents in operating expense for each dollar in the gross loan portfolio. Some highly efficient institutions incur operating expense of 1 cent for each dollar in the gross loan portfolio. On the other hand, inefficient institutions in the industry incur an operating expense of 26 cents for each dollar on their gross loan portfolio.

4.4 Findings, data Analyses and discussion of regression models

This section presents the empirical findings from the econometric result for the factors affecting the financial and operational sustainability of microfinance institutions in Ethiopia. The model for FSS and OSS, based on the result, has been tested for the assumptions of the classical linear regression model (CLRM) before interpreting the result. According to the test results, the model satisfies all the assumptions for the CLRM which is discussed under the following section.

4.4.1. Regression Diagnostic Tests for both FSS and OSS models

In this section the researcher has made a test for the validity of four basic assumptions of CLRM model.

4.4.1-1 Heteroskedasticity

It has been assumed that the variance of the errors is constant, $\sigma 2$; this is known as the assumption of homoskedasticity. If the errors do not have a constant variance, they are said to be heteroskedastic. Consequence of proceeding with the existence of hetroskedasticity is that, the OLS estimators will still give unbiased (and also consistent) coefficient estimates, but they are no longer blue that is, they no longer have the minimum variance among the class of unbiased estimators.

H0= There is no Hetroskedasticity (the error terms are Homoskedastic)

H1=There is Hetroskedasticity

Therefore, for the assumption to hold and to get efficient estimator, this test has been made for both FSS and OSS models using the White test for heteroskedasticity and their results are indicated under the table 4.3 and 4.4 respectively. It is hypothesized that there is no heteroskedasticity in which the null and alternative hypothesis are summarized here under for both models. The most popular method, a white's test has to be made, to ensure that this assumption is no longer violated. Brooks (2008) recommended that not to reject the null hypothesis, the p-value of the F- and $\chi 2$ ('LM') versions of the test statistic and the p-value of the Scaled Explained SS must be higher than 0.05.

Table 4.3: Results of heteroskedasticity test for MFIs' FSS model

Heteroskedasticity Test: White

F-statistic	1.471084	Prob. F(8,121)	0.1747
Obs*R-squared	11.52326	Prob. Chi-Square(8)	0.1738
Scaled explained SS	10.63897	Prob. Chi-Square(8)	0.2230

Source: Author's Eviews Output for hetroskedasticity test, 2015

Table 4.4: Results of heteroskedasticity test for MFIs' OSS model

Heteroskedasticity Test: White

F-statistic	0.638918	Prob. F(7,122)	0.7229
Obs*R-squared	4.597171	Prob. Chi-Square(7)	0.7090
Scaled explained SS	5.367802	Prob. Chi-Square(7)	0.6152

Source: Author's Eviews Output for hetroskedasticity test, 2015

Eviews output in table 4.3 presents three different types of tests for heteroskedasticity indicating that both the F- and $\chi 2$ ('LM') versions of the test statistic give the same conclusion that there is no evidence for the presence of heteroskedasticity, since the p-values are higher than 0.05. The third version of the test statistic, 'Scaled explained SS', as the name suggests is based on a normalized version of the explained sum of squares, suggested also that there is no evidence of heteroskedasticity for both models as the p-values are considerably higher than 0.05. Therefore, there is no evidence to reject the null hypothesis.

4.4.1-2 Test of Autocorrelation (Serial Correlation)

The notion of autocorrelation defines that there is no serial correlation or autocorrelation among the disturbances *u i* entering the population regression function (Gujarati D.N, 2008). The covariance between the error terms over time (or cross-sectional, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are „auto-correlated" or that they are „serially correlated". A test for this assumption is therefore required which is tested by the DW test in this study. The DW test is a test for

first order autocorrelation (a test for a relationship between an error and its immediately previous value). Therefore to conduct the DW test, the hypothesis is stated as follows.

Ho: No Autocorrelation (ρ = 0)

H1: Autocorrelation (ρ ≠0)

As a rule of thumb if the DW test approaches 2, then it is an indication for no autocorrelation. But if the value of the test is 0, then it is an indication for the existence of perfect positive autocorrelation. On the other hand if the value of the DW test equals 4, that means there is perfect negative autocorrelation (Brooks, 2008). In this case for the FSS model, the DW test stands at 1.96 and 2.02 for OSS model. This indicates that both models do not correspond with autocorrelation since their values are not far from 2. The values of the DW test are a few points away from the point that indicates no autocorrelation, therefore, it can be concluded that there is no or little evidence of a relationship between successive residuals and based on this, in both cases we fail to reject the null hypothesis of no autocorrelation. The result is indicated under table 4.5 below on page 78.

Table 4.5:Autocorrelation test for both FSS and OSS models

Models	R. Square	Adj. R. Square	S.E. of the estimates	DW
FSS	0.592071	0.517221	0.224994	1.959936
OSS	0.725314	0.677868	0.242932	2.020923

Source: Author's Eviews Output for Autocorrelation test, 2015

4.4.1-3 Test for Normality

The assumption of normality requires the disturbance to be normally distributed around the mean. This test has been conducted using the Jarque-Bera test. The *p*-value of the normality test should be bigger than 0.05 and Kurtosis should be around 3 for not to reject the null hypothesis of normality at the 5% significance level (Brooks, 2008). The null and alternative hypothesis for the test has been indicated here under.

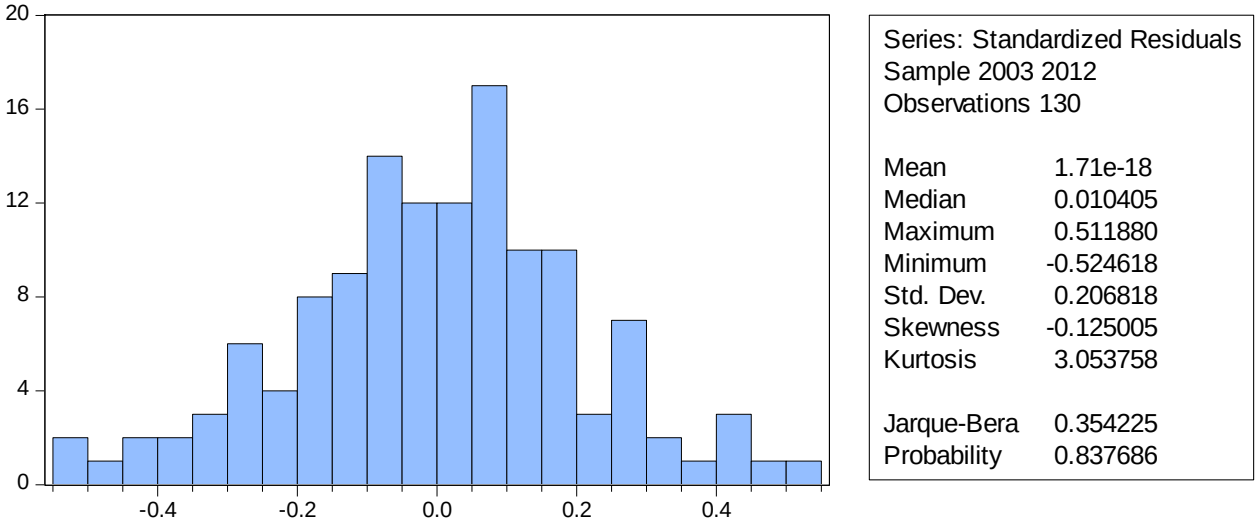
Ho: Normally Distributed Errors

H1: Non-Normal Distribution Errors

A normal distribution is not skewed and is defined to have a coefficient of kurtosis of 3 (Brooks, 2008). Accordingly, the coefficient of the kurtosis in this study is 3.05 for FSS model and 3.04 for OSS model which is almost the same with the suggested kurtosis coefficient of 3. Furthermore, the p-value for the Jarque-Bera (JB) test of FSS and OSS models are 0.35425 (35.43%) and 0.574966 (57.50%) respectively.

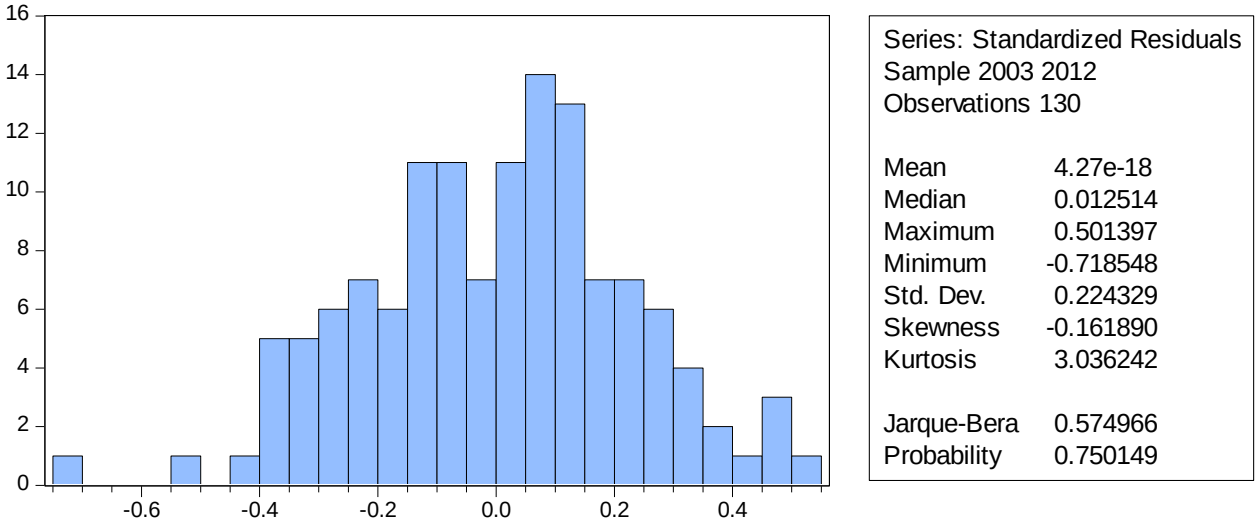
This indicates that the p-value for the Jarque-Bera test for both models is greater than 0.05 which indicates that the errors are normally distributed. Based on the statistical result, we fail to reject the null hypothesis of being normality at the 5% significance level. The histogram and the respective p-values for each model is indicated on below in figures 4.1 and 4. 2.

Figure 4.1 Normality test for Ethiopian MFIs' FSS model



Source: Author's Eviews output for normality test, 2015

Figure 4.2 Normality test for Ethiopian MFIs' OSS model



Source: Author's Eviews output for normality test, 2015

4.4.1-4 Multicollinearity (Covariance matrix estimation)

An implicit assumption that is made when using the OLS estimation method is that the explanatory variables are not correlated with one another (Brooks, 2008). If there is no relationship between the explanatory variables, they would be said to be orthogonal to one another. If the explanatory variables were orthogonal to one another, adding or removing a variable from a regression equation would not cause the values of the coefficients on the other variables to change.

According to Brooks, 2008, in any practical context, the correlation between explanatory variables will be non-zero, although this will generally be relatively being in the sense that a small degree of association between explanatory variables will almost always occur but will not cause too much loss of precision. However, a problem occurs when the explanatory variables are very highly correlated with each other, and this problem is known as multicollinearity. The most simple, operational definition of unacceptable co-linearity makes no pretense to theoretical validity. An admittedly arbitrary rule of thumb is established to constrain simple correlations between explanatory variables to be smaller than 0.8 to 0.9. (Donald E et al, 2005). This assumption has been tested for the variables considered in the study as the independent variables. Therefore, the null hypothesis is

articulated as there is no very high correlation between the independent variables. This is summarized with the alternative hypothesis as follows.

Ho: No Multicollinearity

H1: Multicollinearity

In this particular case, the largest observed positive correlation in for the independent variables of FSS is 0.67 between GDP and inflation and thus, this is sufficiently small as compared to the tolerable correlation sated for this particular study which is 0.9. According to correlation result for all the explanatory variables of OSS, the largest correlation is observed between cost per borrower and operating expense ratio, which has a coefficient value of 0.58. These values are below the standard set used for this particular study which is a correlation coefficient of 0.9. Based on this, it can be reasonably ignored. Therefore, we fail to reject the null hypothesis of no multicollinearity between the independent variables under both cases (models). The result of the Multicollinearity test for all the explanatory variables are indicated under table 4.6 for FSS and table 4.7 for OSS.

Table 4.6 Test for Multicollinearity of explanatory variables of FSS

Correlation	GAR	DER	OER	CPB	GDP	INF	DLR	G
GAR	1							
DER	-0.402203	1						
OER	0.628330	-0.334250	1					
CPB	0.311281	-0.256210	0.535884	1				
GDP	0.274059	-0.025120	-0.064323	-0.318257	1			
INF	-0.201977	0.045834	0.014143	0.239197	-0.668334	1		
DLR	-0.296175	0.284729	-0.196198	-0.025660	-0.358177	0.251375	1	
GLP	-0.468663	0.257226	-0.503703	-0.193221	-0.310929	0.229263	0.593847	

Source: Author's Eviews output for Multicollinearity test, 2015

Table 4.7 Test for Muticollinearity of explanatory variables of OSS

Correlation	ROA	Exp	CPB	NAB	PAR	OER	DER
ROA	1						
Exp	0.390482	1					
CPB	0.058050	0.310324	1				
NAB	0.222994	0.433530	-0.310572	1			
PAR	-0.145462	-0.000509	0.141956	-0.216096	1		
OER	-0.193151	-0.071501	0.535884	-0.584983	0.225610	1	
DER	0.041198	0.186122	-0.256210	0.327589	-0.016654	-0.334250	1

Source: Author's Eviews output for Multicollinearity test, 2015

4.4.1-5 Redundant Fixed Effects Tests

The pooled regression assumes that the intercepts are the same for each firm. This may be an inappropriate assumption, and Brooks (2008) recommended that we could instead estimate a model with firm fixed effects, which will allow for latent firm-specific heterogeneity. The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionally. To determine whether the fixed effects are necessary or not this study run a redundant fixed effects test as recommended by brooks (2008). The results of the test are presented in the following Table. The detail of this test is provided in the appendix at the end of the paper.

Table 4.8 Test for redundant fixed effect for FSS model

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.060487	(12,109)	0.0000
Cross-section Chi-square	66.449669	12	0.0000

Source: Author's E-views Output for redundant fixed effect test for FSS, 2015

Table 4.9 Test for redundant fixed effect for OSS model

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.908115	(12,110)	0.0016
Cross-section Chi-square	35.820900	12	0.0003

Source: Author's E-views Output for redundant fixed effect test for OSS, 2015

From Tables 4.8 and 4.9 above, we can conclude that, the *p*-values associated with the test statistics are almost zero to 4 decimal places, indicating that it is better to employ the fixed effect model than a simple pooled regression model.

4.5 Findings from Financial Self-Sufficiency (FSS) regression model

Based on the regression result on Table 4.10 below on page 86, the study found that the estimated result of multiple regression analysis is at a fairly satisfactory level where the R-squared is 59% and the Adjusted R-squared value is 52%, respectively. The value of the Adjusted R-squared revealed that there are good relationships between dependent and independent variables where all independent variables can explain about 52% of the financial self-sufficiency within the sample. However, the remaining 48% of the change in FFS regression model is explained by other factors which are not included in the regression line. Both the R-squared and the Adjusted R-squared values in this study are found to be

higher (has more explanatory power) than the previous results found in Ethiopia and in other jurisdictions made on related studies. Moreover for panel data, R-Squared greater than 20% is still large enough for reliable conclusions (Nyamsogoro, 2010).

Table 4.10: Regression results for the determinants of financial self-sufficiency

Regression result for FSS:

Dependent Variable: FSS

Method: Panel Least Squares

Date: 08/23/15 Time: 10:34

Sample: 2003 2012

Periods included: 10

Cross-sections included: 13

Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.61255	0.941315	-2.77543	0.0065
*GAR	-0.51503	0.254317	-2.02532	0.0804
DER	-0.02022	0.019915	-1.01506	0.3123
OER	-0.55981	0.812547	-0.68896	0.4923
*LOG(CPB)	-0.15954	0.070872	-2.25112	0.0723
**GDP	13.06089	3.268206	3.996348	0.0001
INF	0.231907	0.242065	0.958036	0.3402
**DLR	0.533864	0.166552	3.205387	0.0018
**LOG(GLP)	0.143275	0.038279	3.74291	0.0003

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.592071	Mean dependent var	0.942569
Adjusted R-squared	0.517221	S.D. dependent var	0.323815
S.E. of regression	0.224994	Akaike info criterion	0.001404
Sum squared resid	5.517831	Schwarz criterion	0.464622
Log likelihood	20.90871	Hannan-Quinn criter.	0.189625
F-statistic	7.910164	Durbin-Watson stat	1.959936
Prob(F-statistic)	0.000000		

*, **= statistically significant at 10% and 1%

Source: Author's E-views Output for FSS regression, 2015

Overall reliability and validity of the model was further enhanced by the Prob(F-statistic) value (0.00000) which indicates strong statistical significance within the population. Thus the null hypothesis of the overall test of significance that all coefficients are equal to zero was rejected as the p-value was sufficiently low (less than 0.05).

The dependent variable being explained is financial sustainability which is measured by financial self-sufficiency ratio. The variables Grants to Total Assets Ratio-GAR, cost per borrower (CPB) macroeconomic variable GDP, Deposits to Loan Ratio-DLR and gross loan portfolio (GLP) are found to be significant regressors of MFIs sustainability in Ethiopia at 10%, 10%, 1%, 1% and 1% respectively. Grants to total asset ratio, and cost per borrower each affected MFIs' sustainability negatively and are statistically significant each at 10% each. On the other hand GDP growth rate, deposit to loan ratio and gross loan portfolio positively affect sustainability and are significant at 1% each. Debt to equity ratio, operating expense ratio and inflation are not statistically found to affect MFIs' financial self-sufficiency and sustainability in Ethiopia. The following section demonstrates the impact each explanatory variables on financial self-sufficiency and overall sustainability.

4.5.1 Grants to Asset Ratio (GAR)

The coefficient of the Gants to Asset Ratio (GAR) is negative (-0.51503) and statistically significant at 10% indicating that having grants as a larger percent of assets decreases the financial self-sufficiency of Ethiopian MFIs for the study period. That is increasing GAR by one percent causes MFIs' FSS ratio to fall nearly by 51% and leading to rejection of the null hypothesis that grants to asset ratio has a significant positive effect on financial self-sufficiency and sustainability of Ethiopian MFIs. The result is consistent with the findings of Bogan (2009) and Magali (2013). This is an important result which calls for the need for Ethiopian MFIs to focus on commercialization of their operation than to strive for subsidies. This is in fact consistent with Bogan's (2009) statement that the negative effect of grants was a meaningful result given that it is consistent with a growing view that MFIs should rely less on grants, soft loans, and other types of donor funds.

4.5.2 Debt to Equity Ratio

Debt to equity ratio (Leverage) is insignificant negative predictor variable in determining financial self-sufficiency. This finding contradicts with the finding on debt to equity ratio by Dissanayake (2012), that leveraged MFI are more sustainable. The result by Hartarska (2007) and Nadolnyak (2007) is also indicated that less leveraged MFIs have better financial self-sufficiency (FSS). These two results are also against each other. This study found debt to equity variable to be insignificant negative predictor for operational self-sufficiency, but Dissanayake found it negative but significant, while Hatarska and Nadolnyak found it strong positive significance for the variable. Therefore, based on the regression result from the study, we fail to reject the null hypothesis which was formulated to show the absence of a significant relationship between debt to equity ratio and financial self-sufficiency of Ethiopian microfinance institutions.

4.5.3 Operating expense ratio (OER)

The regression result for operating expense ratio indicates negative correlation but insignificant for determining the financial self-sufficiency of an MFI in Ethiopia. Based on the regression result, therefore, we fail to reject the null hypothesis that there is no significant relationship between the operating expense ratio of a microfinance institution and its financial self-sufficiency. This indicates that there is no evidence for microfinance

institutions financial sustainability to depend on their operating expense ratio. However, the finding for this variable by another study indicated that there is strong significant negative correlation to financial self-sufficiency. This finding is against Nyamsogoro, (2010) and (Yoshi Fukasawa, 2011), in that both shows operational expense ratio has negative significant relationship with FSS of MFIs.

4.5.4 Cost per Borrower

Cost per borrower**,** which measures the MFI effectiveness in cost reduction given the number of borrowers they are serving, negatively affects the financial self-sufficiency of microfinance institutions in Ethiopia. The researcher used the CPB in its natural logarithm form to reduce the effect of variation in the observed data. This variable is significant at 10% significance level based on the regression result. An increase in the cost per borrower reduces the financial self-sufficiency of the institutions.

Therefore the lower the figure, the better MFI is financially sustainable. From this we can understand that the reduction of cost per borrower will significantly makes an institution to be more sustainable. Therefore, this leads to reject the null hypothesis which was articulated as there is no significant negative relationship between the cost per borrower and financial self-sufficiency of microfinance institutions. Thus, the finding supports the null hypothesis that the cost per borrower affects financial self-sufficiency negatively and significantly. This finding is supported by a finding by Woller and Schreiner (2002), Christen et al (1995) Cull et al (2007) and Dissanayake (2012). However, in a study by Nyamsogoro (2010) the finding reports that, the cost per borrower had a negative correlation but statistically insignificant impact on financial self-sufficiency.

4.5.5 GDP growth rate

It is generally believed that a stable macroeconomic environment is necessary for the viability of MFIs. This study tested the influence of macroeconomic indicator (GDP growth rate) on the sustainability of MFIs. The result shows a positive impact of GDP growth on the sustainability of MFIs with coefficient level of 13.06 and statistically significant at 1% and thus, the null hypothesis that GDP growth rate in Ethiopia negatively and significantly affect sustainability of Ethiopian MFIs be rejected. This is due to, as theoretically believed, improving macroeconomic performance raises overall income level and business

performance which ultimately improves client's repayment ability and hence leading to enhanced MFIs' viability.

4.5.6 Inflation (INF)

Repayment levels are usually weak and low in the presence of higher inflation rates (Weele K. V., & Markowich P., 2001). However the regression result above indicated that even though, inflation has positive relationship with financial self-sufficiency, it is not statistically significant in the model and does not have a clear influence on MFIs sustainability in Ethiopia. Therefore we fail to reject the null hypothesis that inflation has no influence relationship on the FSS of Ethiopian MFIs. MFI clients (who took loan for business purpose) may easily pass-on rising prices to their customers so that their repayment rate remains unchanged. This study further believed that the insignificant effect of inflation may point to the fact that MFIs' regulations and policies adopted by the government may play an important part in creating a favorable environment for the sector to resist the influence of inflation.

4.5.7 Deposit to loan ratio (DLR)

Deposit mobilization of Ethiopian MFIs indicated a positive coefficient of 0.533864 and significant at 1% which further showed that a one percent increase in this ratio causes MFIs' FSS ratio to rise by 0.53%. Considering the findings on grants above, this result further indicated that while grants erode sustainability, commercially available sources (savings) enhanced sustainability during the study period. This leads to rejection of the null hypothesis that deposits to loan ratio has a significant negative effect on financial self-sufficiency and sustainability of Ethiopian MFIs. This result is again consistent with the claims of Bogan (2009) and Magali (2013) that sustainable MFIs can reduce, and even eliminate the need for subsidies if they achieve a significant volume of business in the form of deposits.

4.5.8 Gross loan portfolio (GLP)

The study considered gross loan size as measure of scale of operation. As recommended by Brooks (2008), to reduce the size effect of gross loan amounts, the ratio is transformed in to its natural logarithm form. Gross loan size is found to increase the financial self-sufficiency of MFIs in Ethiopia. The result is statistically significant at 1% and rejected the null hypothesis that Gross loan size has a significant negative effect on cost efficiency of

Ethiopian MFIs. The coefficient of log (GLP) 0.143275indicated that other things being constant a marginal increase in loan portfolio leads to an increase in MFIs financial self-sufficiency by 14 cents. This suggested that MFIs with higher scale operation with big loan size achieve higher financial self-sufficiency than smaller ones. The result supported the findings of Hermes et al (2009) who explained that larger MFIs achieve higher financial self-sufficiency than smaller ones.

According to the regression result analyzed above now we can generate, the operational model for financial self-sufficiency (sustainability) of Ethiopian MFIs as presented in chapter three.

$$\mathbf{FSS}_{it} = \beta o + \beta_1 \mathbf{GAR}_{it} + \beta_2 \mathbf{DER}_{it} + \beta_3 \mathbf{OER}_{it} + \beta_4 \mathbf{log(CPB)}_{it} + \beta_5 \mathbf{GDP}_{it} + \beta_6 \mathbf{INF}_{it} + \beta_7 \mathbf{DLR}_{it} + \mathbf{B}_8 \mathbf{log\ (GLP)} + \varepsilon_{it}$$

Where FSS_{it} is the observed financial self-sufficiency of an MFI i at year t,

B_0 is the constant term showing the value of FSS, when all the coefficient of the independent variables are zero,

GAR_{it} is grants to assets ratio of an MFI i at time t,

DER_{it} is the debt to equity ratio of an MFI i at time t,

OER_{it} is the operating expense ratio of an MFI I at time t,

CPB_{it} is cost per borrower of an MFI i at time t,

GDP_{it} is the GDP growth rate of Ethiopia assigned to an MFI i at time t,

INF_{it} is the rate of inflation of Ethiopia assigned to an MFI i at time t, and

DLR_{it} is the deposits to loan ratio of an MFI i at time t,

GLP_{it} is the gross loan portfolio of an MFI i at time t,

βs are the partial effect of independent variables in period t.

$\boldsymbol{\varepsilon_{it}}$is the error term of an MFI i at time t.

Now based on the regression results presented in Table 4.10, the model of this study can be written as follows:

$$\mathbf{FSS = -2.612553 - 0.327038*GAR - 0.020215*DER - 0.559814 *OER - 0.111349 *CPB + 13.06089 *GDP + 0.231907 *INF + 0.533864 *DLR + 0.143275 *GLP + \varepsilon_{it}.}$$

The following table summarizes the impact of explanatory variables on sustainability from sustainability regression model.

Table 4.11 Summary of regression results from the FSS regression model

Variable	definition	Null hypothesis	Regression result	Statistically significant at	Status of Null hypothesis
GAR	Grants to asset ratio	+	-	10%	Rejected
DER	Debt to equity ratio	+	-	31%	Accepted
OER	Operating expense ratio	+	_	49%	Accepted
CPB	Cost per borrower	+	-	10%	Rejected
GDP	GDP growth rate	-	+	1%	Rejected
INF	Inflation	+	+	34%	Accepted
DLR	Deposits to loan ratio	-	+	1%	Rejected
GLP	Gross loan portfolio	-	+	1%	Rejected

Source: Author's own extraction from Eviews sustainability regression output, 2015.

From the above table 4.11 we can conclude that MFIs' grant to asset ratio, cost per borrower, GDP growth rate, deposit to loan ratio and gross loan portfolio are statistically revealed to affect financial self-sufficiency and sustainability of MFIs.

4.6 Regression result and findings of OSS model

The researcher has assumed that the predictor variables' coefficients are simultaneously different from zero and this is tested for under the next paragraph. As indicated by table 4.12 below on page 96, the observed R^2 value stands at 0.73 (73%), and the adjusted R^2at 0.68 (68%), implying that 68 percent of fitness can be observed in the sample regression line. Furthermore, it measures 68percent of the total variation in the Operational Self-Sufficiency Ratio, is explained by independent variables (return on asset (ROA), age of an MFI (AGE), cost per borrower (CPB), portfolio at risk (PAR), and operating expense ratio (OER) of MFIs.) jointly. Therefore, these five variables explain 73% of the variance of operational self-sufficiency. The reported F-statistics in the regression output is 15.2872 and its Prob. (F-Statistics) is 0.00000.

Based on this the researcher concluded that all the significant explanatory variables are jointly have power in explaining the operational self-sufficiency of microfinance institutions in Ethiopia. Therefore, the null hypotheses which were articulated as the predictor variables coefficients are simultaneously equal to 0 are rejected. Thus, the concluding remark here is that the predictor variables are significant in influencing the changes in the OSS. The rule of thumb for the rejection of the null hypothesis is that, if the P-value of the F-statistics is less than 0.05 (5%). Therefore the Prob. (F-statistics) here is 0.00000. The regression result of the analysis indicates that ROA, and Exp., positively affects the operational sustainability of Microfinance institutions in Ethiopia significantly. These variables affect the operational sustainability significantly at 5%, significance level each. For this particular study, CPB, PAR and OER are found to be strongly and negatively affect the operational self-sufficiency of microfinance institutions. This variable is significant at 5%, 5% and 10% significance levels respectively.

On the other hand, the coefficients of NAB, affects positively but its effect on OSS is insignificant. DER ratio affects OSS of MFIs negatively but still its effect is insignificant. Let us see the details and implication of these variables one by one under the following sections.

Table 4.12: The regression result for OSS model

Dependent Variable: OSS

Method: Panel Least Squares

Date: 08/25/15 Time: 16:31

Sample: 2003 2012

Periods included: 10

Cross-sections included: 13

Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.406142	0.110124	12.76874	0.0000
* ROA	0.731378	0.298634	2.449080	0.0159
* Exp	0.023848	0.011867	2.009659	0.0469
* CPB	-0.000633	0.000297	-2.135316	0.0350
NAB	1.59E-07	3.49E-07	0.453957	0.6508
* PAR	-1.191940	0.580907	-2.051860	0.0426
** OER	-1.380124	0.760793	-1.814059	0.0724
DER	-0.008744	0.021318	-0.410153	0.6825

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.725314	Mean dependent var	1.346154
Adjusted R-squared	0.677868	S.D. dependent var	0.428023
S.E. of regression	0.242932	Akaike info criterion	0.148567
Sum squared resid	6.491749	Schwarz criterion	0.589726
Log likelihood	10.34315	Hannan-Quinn criter.	0.327825
F-statistic	15.28720	Durbin-Watson stat	2.020923
Prob(F-statistic)	0.000000		

*** & ** =significant at 5%, and 10%**

Source: researchers own extraction from the Eview"s result for OSS, 2015

4.6.1 Return on asset (ROA)

As can be shown from the above table ROA has a coefficient of 0.731378 and it is significant at 5% significant level. The coefficient of 0.73 indicates that when MFIs earn 1cents on an investment of an asset, it causes the OSS of an MFI to increase by 73%. Therefore, ROA has a positive significant effect on the OSS of Ethiopian MFIs. And this

has been supported by the research result of (Mohd. Abdur Rahman & Ahmad Rizal Mazlan,, 2014). Therefore, this leads to the rejection of the null hypothesis that ROA doesn't have positive significant effect on OSS of Ethiopian MFIs.

4.6.2 Experience of MFIs (Exp.)

The Age of microfinance institutions refers to the period that an MFI has been in operation since its initial inception. The research result showed that age of an MFI has a positive significant effect on the operational self-sufficiency at 5% significant level. The finding on the impact of experience of microfinance on operational self-sufficiency by Cull et al (2007), Bogan et al (2007), and Robinson (2001) also agree with this particular finding. Based on the regression result we reject the null hypothesis that there is no significant relationship between age and operational self-sufficiency of MFIs in Ethiopia. This research result is against with research result of Nadiya (2011) and Nyamsogoro (2010), that it is not significant in explaining the change in operational self-sufficiency.

4.6.3 Cost per borrower (CPB)

The cost per borrower that an MFI incurs, negatively affects the operational self-sufficiency of Ethiopian microfinance institutions at 5% significance level. The result from the analysis indicates that the increase in cost per borrower reduces the operational sustainability of microfinance institutions. The cost per borrower measures the MFI effectiveness in cost reduction given the number of borrowers they are serving. This implies the role of cost reduction in improving the operational sustainability. The coefficient -0.000633, indicates that a 1 birr increase in cost per borrower leads to a 0.1 cent decrease in the OSS of MFIs. Therefore, we reject the null hypothesis which was articulated as there is no significant relationship between cost per borrower and operational self-sufficiency of microfinance institutions. Thus, the finding supports the alternative hypothesis that the cost per borrower affects operational self-sufficiency negatively and significantly. This finding is in line with that of Dissanayake (2012) which has found a strong negative relationship between cost per borrower ratio and operational self-sufficiency ratio.

4.6.4 Number of Active Borrowers (NAB)

As shown in the regression table result of OSS above, even though it is not significant NAB positively affects the OSS of MFIs in Ethiopia. This result is agrees with the research result

indicated by (Mohd. Abdur Rahman & Ahmad Rizal Mazlan,, 2014). Accordingly, we fail to reject the null hypothesis that there is no significant relationship between number of active borrowers and operational self-sufficiency of MFIs in Ethiopia.

4.6.5 Portfolio at risk (PAR)

According to Fukasawa (2011), the ratio of portfolio at risk has a negative significant effect on operational self-sufficiency of MFIs. This particulait research result also showed that PAR has negative and significat effect on the operational self-sufficiency of Ethiopian MFIs. It is signficant at 5% significant level. The coeficient -1.191940 implies that a 1% increase in PAR leads to a reduction of 1.19194 in the operational self-sufficency ofMFIs. Therefore, we fail to reject the null hypothesis that portfolio at risk (PAR) has no positive significant effect on the operational self-sufficiency of MFIs in Ethiopia.

4.6.6 Operating expense ratio (OER)

The regression result for operating expense ratio indicates negative and significant correlation between operating expense ratio and operational self-sufficiency of an MFI in Ethiopia as per the result shown in the OSS regression table OER is significant at 10% significant level. Based on the regression result, therefore, we fail to reject the null hypothesis that OER negatively and significantly affects the OSS of MFIs in Ethiopia. This indicates that there is clear evidence that microfinance institutions operational sustainability is dependent on their operating expense ratio. However, the finding for this variable by another study indicated that there is strong significant negative correlation to financial self-sufficiency. This finding research results is in line with the research results of Nyamsogoro, (2010) and (Yoshi Fukasawa, 2011), in that both shows operational expense ratio has negative significant relationship with sustainability of MFIs.

4.6.7 Debt to Equity Ratio

Debt to equity ratio (Leverage) is insignificant negative predictor variable in determining operational self-sufficiency. This finding contradicts the finding on debt to equity ratio by Dissanayake (2012), that leveraged MFI are more sustainable. The result by Hartarska and Nadolnyak (2007) is also indicated that less leveraged MFIs have better operational self-sufficiency (OSS). These two results are also against each other. This study found debt to equity variable to be insignificant negative predictor for operational self-sufficiency, but Dissanayake found it negative but significant while Hatarska and Nadolnyak found it

strong positive significance for the variable. Therefore, based on the regression result from the study, we fail to reject the null hypothesis which was formulated to show the absence of a significant relationship between debt to equity ratio and operational self-sufficiency of Ethiopian microfinance institutions.

Accordingly we can write the OSS operational model specified in chapter three in this study as follows:

$$\mathbf{OSS_{it}}=\beta_0+\beta_1\mathbf{RoA_{it}}+\beta_2\ \mathbf{Exp_{it}}+\beta_3\mathbf{CPB_{it}}+\beta_4\mathbf{NAB_{it}}+\beta_5\mathbf{PAR_{it}}+\beta_6\mathbf{OER_{it}}+\beta_7\mathbf{DER_{it}}+\boldsymbol{\varepsilon}_{it}$$

Where:

OSS_{it} is the operational self-sufficiency ratio (dependent variable) of an MFI i at period t,

β_0 is a constant term; $\beta_{1\text{-}n}$ measures the partial effect of independent or explanatory variables 1-n for period *t,*

RoA_{it} is the return on asset ratio of an MFI i at time t,

Exp_{it} is experience of an MFI i at time t,

CPB_{it} is the natural logarithm value of cost per borrower of an MFI i at time t,

NAB_{it} is the number of active borrowers of an MFI i at time t,

PAR_{it} is the portfolio at risk ratio of an MFI i at time t,

OER_{it} is the natural logarithm of gross loan portfolio of an MFI i at time t,

DER_{it} is the debt to equity ratio of an MFI i at time t,

$\boldsymbol{\varepsilon}_{it}$ is the error term

Now based on the regression result shown in table 4.12 we can produce the below operational model for operational self-sufficiency of MFIs in Ethiopia.

$$\mathbf{OSS_{it}=1.406142+0.731378*RoA+0.023848*Exp-0.000633*CPB+0.000000159*NAB-1.191940*PAR-1.380124*OER-0.008744*DER}$$

The following table summarizes the impact of explanatory variables on operational self-sufficiency from OSS regression model.

Table 4.13 Summary of regression results from the OSS regression model

Variable	definition	Null hypothesis	Regression result	Statistically significant at	Status of Null hypothesis
ROA	Return on Asset	-	+	5%	Rejected
Exp	Experience of MFI	-	+	5%	Rejected
CPB	Cost per borrower	+	-	5%	Rejected
NAB	Number of active borrowers	-	+	65%	accepted
PAR	Portfolio at risk	+	-	5%	Rejected
OER	Operating expense ratio	+	_	10%	rejected
DER	Debt to equity ratio	-	-	68%	Accepted

Source: Author's own extraction from Eviews OSS regression output, 2015.

CHAPTER FIVE

5 Conclusions and recommendation

In this section the researcher presents the conclusions and recommendations based on the findings of the study.

5.1 Conclusions from descriptive statistics

Within the period covered by this study, Ethiopian MFIs scored an average Financial Self-Sufficiency (FSS) ratio of 94%. Accordingly, as indicated in analysis section of this study Ethiopian MFIs are not financially self-sufficient (financially sustainable) in reference to the international requirement of an FSS of 100% benchmark. The result below 100% means that it is difficult for MFIs to cover all costs and their obligations without ongoing donation, concessional loan or government subsidy. Comparison of Ethiopian MFIs' FSS with other countries indicated that MFIs operating in Eastern African and southern African regions had higher mean scores of an FSS ratio and they are said to be more sustainable than Ethiopian MFIs. However, during the period covered in this research Ethiopian MFIs maintained a mean score of 134% operational self-sufficiency ratio. The ratio of 1.34 indicates that Ethiopian MFIs are operationally self-sufficient. In general, it can be inferred from this research that MFIs in Ethiopia are operationally sustainable, but they are not financially sustainable.

Ethiopia MFIs maintained donated equity of 23% in their total assets. Even though there are MFIs who do not maintain donated equity in their assets, highly donated/subsidized Ethiopian MFIs maintained grants as high as 90% of their total assets. The mean value in Ethiopia is higher than the mean value of the same ratio revealed in Bogan's (2009) study which is an indication of the fact that the MFI sector in Ethiopia is highly subsidized as compared to the MFIs sector in the rest of the world.

The mean value of DER of Ethiopian MFIs stood at 1.93 during the study periods and the maximum DER scores of Ethiopian MFIs found to be 9.90. This indicates that debt financing is more considered instead of having proportional financing structure, and can

be concluded that MFIs in Ethiopia are therefore are highly leveraged as compared to other peer African MFIs.

OER, according to CGAP (2009), is the most commonly used measure of microfinance efficiency. The study shows that the operating expense ratio for the Ethiopian microfinance industry 0.09 in its mean. This indicates that on average they are incurring 9 cents in operating expense for each birr in the gross loan portfolio. Some highly efficient institutions incur operating expense of 1 cent for each birr in the gross loan portfolio. On the other hand, inefficient institutions in the industry incur an operating expense of 26 cents for each birr on their gross loan portfolio.

The mean, maximum and minimum scores of MFI's cost per borrower Ethiopian which were Birr 153, Birr 929 and Birr 36 are changed to their dollar values of $13.93, $84.14 and $3.26 respectively to make comparison against empirical evidences. Other studies indicated that the average Ethiopian MFIs appeared to look more cost efficient than MFIs in the rest of the world. The maximum score of cost per borrower of Ethiopian MFIs also revealed in this study is well below the maximum score revealed in Nawaz (2010) study of $1694.

Ethiopian MFIs maintained deposit to loan ratio of 24% while MFIs in Central Africa, Eastern Africa, Southern Africa ,Western Africa and the entire continent of Africa have mean score of DLR 154.8%, 48.6%,30.5%, 59.5% and 154.8% respectively indicating that MFIs in these regions have mobilized higher commercial sources (savings) to finance their loan than MFIs in Ethiopia. Therefore, this can enable the researcher to infer most of Ethiopian MFIs are not deploying deposit to finance their loan.

During the study period covered the mean value of GDP and inflation were found to be 10.9% and 17% respectively and both are higher than the average of the entire African continent which was 3.8% and 9% as shown in the Mix Market's report (2011). During this particular study period, Ethiopian MFIs provided an average gross loan size of Birr $27.17mln.This is much higher, than the mean score of African MFIs $4.4million.Return on asset measures how well the institution use all their assets and it is also an overall measure of profitability reflecting both the profit margin and the efficiency of the institutions. During the period covered by this study, Ethiopian MFIs have maintained an average return on asset of .01, indicating that they earn 0.01 birr on a 1 birr asset they

invested. And the maximum and minimum return on asset is 0.015 and -0.78 birr respectively.

MFIs in Ethiopia are young in terms of the duration of time in which they stayed in operation. On average they have served the society for around 9 years. Some MFIs have got experience of 15 years during 2012 while some few have 2 years experience during year 2003. Finally on average a microfinance institution in Ethiopia is reaching 134,037numbers of the poor. The maximum numbers of poor borrowers reached by a microfinance institution in the study period considered is 784,541 and the minimum is 2,866.

5.1.2 Conclusion on regression results of financial self-sufficiency (FSS)

In order to assess the significant determinant variables for sustainability of MFIs, the researcher hypothesized that grant to asset ratio, debt to equity ratio, operational expense ratio, cost per borrower, GDP growth rate, inflation rate, deposit to asset ratio of MFI, and gross loan portfolio of an MFI are statistically significant predictor variables in determining financial self-sufficiency. On the other hand the researcher has hypothesized that: return on asset, age of MFI, cost per borrower, number of active borrowers, portfolio at risk, operating expense ratio, and debt to equity ratio to be statistically significant predictor variables in determining operational self-sufficiency.

Accordingly, the researcher found that grant to asset ratio, GDP growth rate, cost per borrower, deposit to loan ratio and the gross loan portfolio are statistically significant variables in determining financial self-sufficiency. Similarly the study found that return on asset, age, cost per borrower, portfolio at risk and operating expense ratio are statistically significant predictor variables in determining the financial self-sufficiency of Ethiopian microfinance institutions. From the Eviews regression result the adjusted R^2 for both FSS and OSS models 52% are 68% respectively. Therefore, it can be concluded that all the above mentioned independent variables of both proxies jointly explain both the dependent variables of financial self-sufficiency and operational self-sufficiency of Ethiopian MFIs.

The researcher's test result has proved that the models for both dependent (FSS & OSS) variables meet all the assumptions of classical linear regression model (CLRM). It has been

proved that there was no evidence of the problems of multicollinearity, hetroscedasticity, autocorrelation and non-normality.

5.2 Recommendations

In reference to the findings of the study, the researcher has recommended certain points what he thought to be very critical if considered and implemented by the microfinance institutions and other concerned bodies accordingly and properly. Therefore, the following suggestions have been given.

5.2.1 Recommendations to the findings of descriptive statistic

Even though, the Ethiopian MFIs show a good average score of operational self-sufficiency ratio (134%), which is well above the average requirement of 100%, during the study period covered, the mean score of Financial Self-Sufficiency (FSS) ratio was 94%. This indicates that the on average Ethiopian MFIs are not financially self-sufficient, out-performed by regional MFIs and hence they should maintain a sufficient level of FSS ratio to ensure their financial sustainability. Empirical evidences showed that unless 100 % FSS ratio is reached, the long-term provision of credit services is undermined and MFIs opt on the continued necessity to rely on donor funds.

MFIs in Central Africa, Eastern Africa, Southern Africa, and Western Africa maintained a higher deposit to loan ratio than Ethiopian MFIs. Ethiopian MFIs should mobilize deposits sufficient enough to finance their loan portfolio so that they can be benefited from the cheaper source of fund (saving) and reduce the need for subsidies.

This study result shows that, there are MFIs showing a DER ratio as high as 9.9. Those MFIs scoring maximum DER (highly leveraged MFIs) should be cautious because theories suggest that higher DER bound to exert pressure on profit margin (sustainability and efficiency) during bad economic situations. Therefore, they have to review their mix of capital structure seriously.

In terms of loan size Ethiopian MFIs on the average can be categorized in to large scale MFIs and out-performing regional MFIs in gross loan size but the loan size in Ethiopia is financed by grant, and subsidy. Therefore, this huge loan size would be better if backed by high volume of deposits.

During the study period covered by this research, Ethiopian MFIs showed an average score of cost per borrower which is well below the average score of most African country MFIs. Therefore, the researcher recommends that as this variable is the most important indicator of efficiency, MFIs in Ethiopia has to keep the momentum or trend of reduced cost per borrower ratio. MFIs should utilize the opportunities of macrocosmic environment because improved macroeconomic performance raises overall income level which ultimately improves clients repayment ability and hence sustainability of MFIs.

5.2.2 Recommendations to the findings from financial self-sufficiency model

Ultimately, the goal of microfinance is to give low income peoples an opportunity to become self-sufficient for their entrepreneurship development and subsidize their livelihood. However, in order to increase the number of poor borrowers and make them self-sufficient, the MFIs themselves should ensure their sustainability first and one of the ways to ensure sustainability is financial self-sufficiency. The financial sustainability (FSS) indicates the ability of MFI to cover all of its operating costs and costs of capital without depending on subsidies. This model of financial self-sufficiency for measuring financial sustainability for Ethiopian microfinance institutions is more comprehensive. This study has investigated the financial determinants of Ethiopian MFIs using model of proxy; financial self-sufficiency.

The research indicated that Ethiopian MFIs are not financially self-sufficient and not sustainable enough to serve the large number of poor that need this service badly. Therefore, the researcher recommends, that Ethiopian MFIs should work hard to improve their financial self-sufficiency. This can be achieved by using deposit as a source of finance, while increasing the scale of operation (gross loan portfolio) instead of using grant as a source of financing their loan. This is to mean that, as the study FSS regression model result showed that GAR affects the financial sustainability MFIs negatively and significantly. Accordingly Ethiopian MFIs should resort to commercialization of their operation rather than relying on grants and soft loans. They should maintain a higher level of deposits to loan ratio and a lower level of grants to asset ratio. The findings from grants and deposit mobilizations indicated that sustainable MFIs can reduce, and even eliminate

the need for subsidies if they achieve a significant volume of business in the form of deposits.

Therefore, MFIs should go in a smart way to avoid grants, subsidy and soft loans in order to be financially self-sufficient. The FSS model also prevailed that cost per borrower has also affected the financial self-sufficiency of MFIs negatively and significantly during the study period considered. Even though, Ethiopian MFIs showed a minimum average cost per borrower in the period considered, the researcher still recommends that MFIS should be cost conscious in handling and processing a loan, as this is an important parameter to measure efficiency of an MFI. They can reduce the cost per borrower by increasing their gross loan portfolio, because the total cost will be distributed over the gross loan, at this time they can achieve an economy of scale. By doing this MFIs can improve their financial self-sufficiency and their sustainability as well. Therefore, by increasing the deposit to loan ratio, and the gross portfolio and by reducing the ratio of cost per borrower and debt to equity while using the opportunity of GDP growth rate, MFIs can improve their financial self-sufficiency and be sustainable.

5.2.3 Recommendations to the findings from operational self-sufficiency model

It has been seen that MFIs in Ethiopia are operationally self-sufficient given the period included in the study. Different studies indicated that, MFIs sustainability is highly dependent on the operational self-sufficiency like that of FSS. The result of this particular study suggested that Ethiopian MFIs maintained a mean of 134% operational self-sufficiency ratio. When compared to the standard percentage of 100% OSS requirement, this is well enough to say Ethiopian MFIs are operationally self-sufficient. However, this ratio can be further improved by efficient management of the determinants of OSS. From the regression result of OSS model, the researcher identified that return on asset, age, cost per borrower, portfolio at risk and operating expense ratio are statistically significant variables to determine the operational self-sufficiency of Ethiopian MFIs. To keep the momentum of profitability MFIs should stay profitable and the return on asset should be high. The mean value of return on asset ratio as shown is very low; however, this is a positive significant variable for determining operational self-sufficiency. Therefore, MFIs should watch through their non-performing assets (idle) asset either to make operational or

to depose off. Age seems to have positive significant relationship with OSS; therefore, Ethiopian MFIs should ensure to themselves, the improvement on operational self-sufficiency as their experience (age) increase. Cost per borrower has a negative significant effect on operational self-sufficiency of Ethiopian MFIs. Therefore, MFIs should reduce CPB to the maximum possible by increasing the number of borrowers, and gross portfolio and by keeping scale of economy and further improve the OSS. OSS can also be further improved by reducing the ratios of PAR and OER as they have significant negative relationship.

To summarize, sustainability in general can be ensured by achieving financial self-sufficiency and operational self-sufficiency. This is to mean that, earning from interest should be enough to cover operating costs, loan losses and interest and adjustment expenses. However, MFIs must operate efficiently enough that reasonable, affordable and competitive interest rates can be charged to cover these costs. Therefore, long term sustainability requires MFIs to manage delinquency, keep their grant, donation and soft loans low (by mobilizing savings), reduce their cost per borrower, increase their loan portfolio, decrease risky portfolio, keep operating costs to the minimum and most importantly, by doing so, they have to set interest rates to cover all these costs.

5.2.4 Recommendations to government and donors

Policy directions, Effective regulation and financial infrastructure: Microfinance institutions can develop sustainable commercial services on a permanent basis and expand their scope of operations and outreach only if they operate within an appropriate financial infrastructure, such as information systems and training facilities. That means the legal framework and supervision and regulation of microfinance institutions, including self-regulation and performance standards need to be established to facilitate sound growth and improve the capacity of microfinance institutions to leverage funds in the market and provide competition.

Historically, governments have used credit schemes as a way to transfer resources to specific target populations. Using financial institutions are one of the ways to achieve this objective. Therefore, the researcher recommends the government to play a central role in creating a encouraging environment for enabling MFIs to ensure their long-term sustainability; by maintaining the macroeconomic stability through appropriate monetary

and fiscal policies, by giving a vital role to the micro finance institutions to play during formulating poverty reduction strategies, and explicitly recognize them, by adjust regulatory frameworks to permit the microfinance institutions to offer lending services to a wide range of poor people as premature or restrictive regulations can stifle innovation, and finally by improving supervisory capacity beyond simply licensing them.

Government and donors-Subsidies: Although the study recommended that government policy should limit access to grants and promotes commercialization, governments and donors can promote microfinance in remote areas in Ethiopia where required initial start-up costs are high, and private firms are hesitant to enter the market. Government and donors should avail funds with the understanding that MFI projects require substantial subsidies when they are first introduced. If these projects are not subsidized in their early years, they will be forced to charge high interest rates that clients could not pay. However, with the expansion in scale and commercialization (growth in savings and loans), subsidies can decline dramatically.

5.2.5 Further Research Directions

This study is limited to only quantitative aspect; it doesn't include the qualitative factors for the determinants of MFIs sustainability in Ethiopia. Therefore, the researcher recommends future researchers to do comprehensive study by considering other influencing factors (like: Political factors, Geographical factors, and others) for the sustainability of Ethiopian MFIs.

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Annexes

Annex 1: Hetroskedasticitytest for FSS model

Heteroskedasticity Test: White

F-statistic	1.471084	Prob. F(8,121)	0.1747
Obs*R-squared	11.52326	Prob. Chi-Square(8)	0.1738
Scaled explained SS	10.63897	Prob. Chi-Square(8)	0.2230

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 09/07/15 Time: 16:47

Sample: 1 130

Included observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.151283	0.140713	1.075116	0.2845
GAR^2	-0.084675	0.088397	-0.957896	0.3400
DER^2	-0.001015	0.000650	-1.561216	0.1211
OER^2	-0.772957	1.084233	-0.712906	0.4773
LOG(CPB)^2	-0.002978	0.002234	-1.332882	0.1851
GDP^2	2.776000	5.779556	0.480314	0.6319
INF^2	0.485954	0.253350	1.918114	0.0575
DLR^2	-0.085159	0.114140	-0.746097	0.4571
LOG(GLP)^2	-9.82E-05	0.000209	-0.471074	0.6384

R-squared	0.088640	Mean dependent var	0.070441
Adjusted R-squared	0.028385	S.D. dependent var	0.103237
S.E. of regression	0.101762	Akaike info criterion	-1.665649
Sum squared resid	1.253008	Schwarz criterion	-1.467127
Log likelihood	117.2672	Hannan-Quinn criter.	-1.584983
F-statistic	1.471084	Durbin-Watson stat	1.703775
Prob(F-statistic)	0.174674		

Source: Author's Eviews output, 2015

Annex 2: Redundant fixed effect test for FSS model

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	6.060487	(12,109)	0.0000
Cross-section Chi-square	66.449669	12	0.0000

Cross-section fixed effects test equation:

Dependent Variable: FSS

Method: Panel Least Squares

Date: 08/29/15 Time: 10:22

Sample: 2003 2012

Periods included: 10

Cross-sections included: 13

Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.444118	0.712966	-0.622916	0.5345
GAR	-0.152471	0.190183	-0.801705	0.4243
DER	-0.026850	0.015260	-1.759519	0.0810
OER	-0.386496	0.778691	-0.496341	0.6206
LOG(CPB)	-0.046959	0.064625	-0.726633	0.4689
GDP	6.063502	2.967175	2.043527	0.0432
INF	0.374572	0.285167	1.313519	0.1915
DLR	0.475286	0.170088	2.794356	0.0060
LOG(GLP)	0.050525	0.021316	2.370307	0.0194

R-squared	0.356206	Mean dependent var	0.958508
Adjusted R-squared	0.313641	S.D. dependent var	0.308016
S.E. of regression	0.255181	Akaike info criterion	0.173033
Sum squared resid	7.879217	Schwarz criterion	0.371554
Log likelihood	-2.247124	Hannan-Quinn criter.	0.253699
F-statistic	8.368553	Durbin-Watson stat	1.232426
Prob(F-statistic)	0.000000		

Annex 3: Hetroskedasticity test OSS model

Heteroskedasticity Test: White

F-statistic	0.638918	Prob. F(7,122)	0.7229
Obs*R-squared	4.597171	Prob. Chi-Square(7)	0.7090
Scaled explained SS	5.367802	Prob. Chi-Square(7)	0.6152

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 08/25/15 Time: 14:55

Sample: 1 130

Included observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.100603	0.050343	1.998367	0.0479
ROA^2	2.652030	1.805886	1.468548	0.1445
AGE^2	0.000189	0.000212	0.894973	0.3726
CPB^2	-0.002336	0.002436	-0.958766	0.3396
NAB^2	-4.97E-14	1.07E-13	-0.463602	0.6438
PAR^2	0.607179	0.910900	0.666570	0.5063
OER^2	-0.546139	0.948919	-0.575538	0.5660
DER^2	-5.99E-05	0.000685	-0.087451	0.9305

R-squared	0.035363	Mean dependent var	0.064176
Adjusted R-squared	-0.019985	S.D. dependent var	0.104907
S.E. of regression	0.105950	Akaike info criterion	-1.592136
Sum squared resid	1.369499	Schwarz criterion	-1.415672
Log likelihood	111.4888	Hannan-Quinn criter.	-1.520432
F-statistic	0.638918	Durbin-Watson stat	1.890202
Prob(F-statistic)	0.722933		

Annex 4: Redundant fixed effect test for OSS model

Redundant fixed effect test:

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.908115	(12,110)	0.0016
Cross-section Chi-square	35.820900	12	0.0003

Cross-section fixed effects test equation:

Dependent Variable: OSS

Method: Panel Least Squares

Date: 08/25/15 Time: 16:42

Sample: 2003 2012

Periods included: 10

Cross-sections included: 13

Total panel (balanced) observations: 130

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.642915	0.091292	17.99617	0.0000
ROA	1.230844	0.290892	4.231273	0.0000
AGE	-0.006676	0.010282	-0.649277	0.5174
CPB	-0.000327	0.000273	-1.198368	0.2331
NAB	1.02E-06	1.79E-07	5.718151	0.0000
PAR	-1.440016	0.453352	-3.176371	0.0019
OER	-1.943733	0.588456	-3.303107	0.0013
DER	-0.039113	0.015097	-2.590840	0.0107

R-squared	0.638170	Mean dependent var	1.346154
Adjusted R-squared	0.617409	S.D. dependent var	0.428023
S.E. of regression	0.264749	Akaike info criterion	0.239497
Sum squared resid	8.551250	Schwarz criterion	0.415961
Log likelihood	-7.567303	Hannan-Quinn criter.	0.311200
F-statistic	30.73925	Durbin-Watson stat	1.624757
Prob(F-statistic)	0.000000		

Source: Author's Eviews output, 2015